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REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1873-76

UNDER THE COMMAND OF

CAPTAIN GEORGE S. NARES, R.N., F.R.S.

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

THE LATE

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PART LXXII.—REPORT ON THE HETEROPODA

BY EDGAR A. SMITH, F.Z.S.

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EDITORIAL NOTE.

In this Report Mr. Edgar A. Smith, F.Z.S., of the British Museum, has brought together systematic lists showing the present state of our knowledge of the Heteropoda, founded on the collections made during the Expedition. The Report, which consists of 56 pages and 5 woodcuts, will be most useful to future investigators. The Manuscript was received by me on the 21st January 1888.

The Report on the Lamellibranchiata collected by the Expedition, likewise by Mr. Smith, was published in 1885 and forms Part XXXV. of the Zoological Series of Reports.

John Murray.

Challenger Office, 32 Queen Street,
Edinburgh, *9th May* 1888.

THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY.

REPORT on the HETEROPODA collected by H.M.S. Challenger during the Years 1873–76. By EDGAR A. SMITH, F.Z.S., Assistant in the Zoological Department of the British Museum.

INTRODUCTION.

THE collection of Heteropoda submitted to me for examination and description consists of a number of dead shells of Atlantidæ, which were dredged at various stations in the Atlantic and Pacific Oceans, and of a few specimens of the same family and others belonging to the Pterotracheidæ which were obtained occasionally by surface dredging. Most of the latter specimens are not in very good condition, the majority being more or less mutilated, so that their identification has been all the more difficult and in some cases impossible.

As no list of the species of this group of Mollusca has been attempted for many years, it was suggested by Mr. John Murray that I should compile a synonymic catalogue of the various families, genera, and species, which might prove of service to those who may have occasion to study the Heteropoda.

Such a catalogue I have prepared, and have endeavoured to make the references as complete as the leisure time[1] at my disposal would allow. The chronological sequence has been adopted in order that the priority of names can be seen at a glance and the progressive knowledge of each species the more readily traced.

[1] The collection was placed in my hands on October 1, 1887.

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LITERATURE OF THE SUBJECT.

Besides the accounts relating to the Heteropoda which are given in the various manuals on Mollusca by Rang, Woodward, Philippi, H. and A. Adams, Chenu, Tryon, Fischer, and others, several more detailed narratives are to be found in the works of d'Orbigny, Souleyet, Huxley, Krohn, Leuckart, Gegenbaur, Macdonald, &c.

A very excellent work upon this group of animals by Keferstein, which was published in Bronn's Thierreich,[2] gives a detailed account of the knowledge of this subclass of Mollusca up to the year 1866.

The work commences with an introductory chapter (pp. 809–813), containing (1) a historical account of the study of this group of animals; (2) some observations upon the various names which have been applied to it; and (3) a list of the principal works which treat upon the subject.

The second chapter (pp. 814–835) enters very fully into the external structure and the internal anatomy; the third (pp. 835–838) is devoted to the history of the development of these animals; the fourth (pp. 838–843) gives an account of the economy, their pelagic mode of life, the positions in which they swim and the food they subsist on. The fifth chapter (pp. 843–850) discusses the classification of the Heteropods, their natural position in the systematic arrangement of the Mollusca, gives succinctly the characters which distinguish the group, and concludes with diagnoses of the families and genera. The sixth and last chapter (pp. 851–852) treats upon the distribution of the species, both recent and fossil.

Such being the scope of this work, it may in the main be consulted as a sound text-book upon this branch of Mollusca. It would therefore be of little use to reproduce in this Report a detailed account of the Heteropoda (as at one time I thought of doing) such as that set forth in Keferstein's treatise; but several very important memoirs have been published since the production of that work which give further information respecting

[1] Die Klassen und Ordnungen des Thierreichs, vol. iii. pt. ii. pp. 809–852, pls. 68–70.

the anatomy, histology, and development of certain groups, and of these the following are the principal :—

1869. Boll, Beiträge zur vergleichenden Histiologie des Molluskentypus, pp. 1–112, pls. i.–iv., 1869.
1871. Rattray, On the Anatomy, Physiology, and Distribution of the Firolidæ. *Trans. Linn. Soc. Lond.*, vol. xxvii. p. 255, pls. xliii., xliv.
1875. Ranke, Der Gehörvorgang und das Gehörorgan bei Pterotrachea. *Zeitschr. f. wiss. Zool.*, 1875, Suppl. vol. xxv. pp. 77–102, pl. v.
1876. Ranke, Das acustische Organ im Ohre der Pterotrachea. *Archiv f. mikrosk. Anat.*, 1876, vol. xii. pp. 565–569.
1876. Fol, Sur le développement embryonnaire et larvaire des Hétéropodes. *Arch. d. Zool. Expér.*, 1876, vol. v. pp. 105–158, pls. i.–iv.
1876. Claus, Das Gehörorgan der Heteropoden. *Archiv f. mikrosk. Anat.*, 1876, vol. xii. pp. 103–117, pl. x.
1877. Edinger, Die Endigung der Hautnerven bei Pterotrachea. *Archiv f. mikrosk. Anat.*, 1877, vol. xiv. pp. 171–178, pl. xi.
1878. Claus, Ueber den acustischen Apparat im Gehörorgan der Heteropoden. *Archiv f. mikrosk. Anat.*, 1878, vol. xv. pp. 341–348.
1880. Krukenberg, Die pendelartigen Bewegungen des Fusses von Carinaria mediterranea. *Vergleich. Physiol. Studien*, 1880, pp. 177–180.
1885. Paneth, Beiträge zur Histiologie der Pteropoden und Heteropoden. *Archiv f. mikrosk. Anat.*, 1885, vol. xxiv. pp. 230–288, pls. xiv.–xvi.
1886. Warlomont, Étude de quelques points de la structure des Firoles. *Journ. Anatomie et Physiol.*, 1886, vol. xxii. pp. 331–350, pl. xii.
1886. Grenacher, Abhandlungen zur vergleichenden Anatomie des Auges. II. Das Auge der Heteropoden. 2 plates, 65 pages, *Abhandl. naturf. Gesellsch. Halle*, vol. xvii.

SPECIES OF HETEROPODA OBTAINED BY THE CHALLENGER.

Family PTEROTRACHEIDÆ.

Pterotrachea, n. sp. (?)	Off Banda, September 29, 1874.
„ (?)	North Atlantic, January 28, 1873.
„ (?)	Off Boston, U.S.
Firoloida desmaresti,	South Atlantic, March 2 and 3, 1876.
Cardiopoda placenta,	Off Arrou Island, September 23, 1874.
„ sp. jun.,	North Pacific, July 4, 1875.
Carinaria cristata,	Near Papua, September 15, 1875. Also Station 218, North of Papua, at bottom.
„ „ (?) jun.,	North of the Admiralty Islands, March 16, 1875.
„ *lamarcki* (?) jun.,	Station 84, at bottom.
Carinaria, n. sp. (?),	North Atlantic, January 28, 1873.
„ sp. fry,	Station 24, at bottom.
„ sp. jun.,	Station 185, at bottom.

Family ATLANTIDÆ.

Atlanta peronii,	Stations[1] 23, 24, 33, 75, 78, 85, 120, 122, at bottom. Also at surface, near Cape York, August 25, 26, 1874; North of New Guinea, February 1875; Pacific, July 12, 21, 1875; Mid-Pacific Ocean, September 6, 1875.
Atlanta inflata,	Stations 33, 85, 104, at bottom.
Atlanta lesueurii,	Stations 23, 33, at bottom.
Atlanta gaudichaudi,	Station 185, bottom. Also at surface, West Pacific, February 1875.
Atlanta souleyeti,	Stations 23, 24, 33, 75, 78, 85, 120, 122, at bottom.

[1] Stations 23, 24, 33, 75, 78, 84, and 85, are North Atlantic; 120 and 122, South Atlantic; Station 185, Torres Strait, North Australia.

Atlanta fusca, . .	Stations 23, 24, 33, 75, 85, 120, 122, 185, at bottom. Also at surface, off Kandavu, Fiji, August 11, 12, 1874; near Cape York, August 25, 26, 1874; North Pacific, July 21, 1875.
Atlanta inclinata, . .	Stations 23, 24, 33, 120, 122, 185, at bottom. Also at surface, North Pacific, July 21, 1875.
Oxygyrus keraudrenii, .	At surface, South Atlantic, March 2, 3, and April 28, 1876.

SYNONYMY OF THE HETEROPODA.

MOLLUSCA.

Class GASTROPODA.

Subclass HETEROPODA.

1812. *Hétéropodes*, Lamarck, Extrait du cours de Zool., p. 124.
1821. *Gasteropterophora*, Gray, London Medical Repository, vol. xv. p. 235.
1822. *Hétéropodes*, Lamarck, Anim. sans Vert., vol. vii. p. 669; ed. 2, vol. xi. p. 373.
1822. „ Férussac, Tabl. syst., p. xxxvii.
1824. *Nucleobranchiata*, Blainville, Dict. d. Sci. Nat., vol. xxxii. p. 282.
1824. *Heteropoda*, Children, Quart. Journ. Sci. Lit. and Arts, vol. xvi. p. 256.
1825. *Urobranchia* (*partim*), Latreille, Fam. nat. Règne anim., p. 173.
1825. *Heteropodes*, Eschscholtz, Oken's Isis, p. 735.
1825. *Nucleobranchiata*, Blainville, Dict. d. Sci. Nat., vol. xxxv. p. 212.
1825. „ *id.*, Man. de Malacol., p. 491.
1827. *Nucléobranches*, Rang, Mem. Soc. Hist. Nat., vol. iii. p. 372.
1828. *Caryobranchiata*, Menke, Synopsis Moll., p. 5; ed. 2 (1830), p. 9.
1829. *Nucléobranches*, Rang, Man. Moll., p. 119.
1830. *Hétéropodes*, Cuvier, Règne Anim., ed. 2, vol. iii. pp. viii, 66.
1830. „ Deshayes, Encycl. Méthod., vol. ii. p. 270.
1832. *Nucléobranches*, *id.*, *loc. cit.*, vol. iii. p. 632.
1832. *Heteropoda*, Wiegmann and Ruthe, Handbuch d. Zool., p. 517.
1833. *Heteropoden*, Oken, Naturgesch., p. 553.
1834. *Heteropoda*, Gray, Griffith's Anim. Kingd., vol. xii. p. 49.
1836. „ d'Orbigny, Voy. Amér. Mérid., vol. v. p. 139.
1838. *Nucléobranches*, Potiez and Michaud, Galerie Moll., vol. i. p. 47.
1839. *Heteropoda*, d'Orbigny, Hist. Nat. Canaries Moll., p. 34.
1839. *Heteropoden*, Krohn, Müller's Archiv f. Anat. u. Physiol., p. 333 (On the Eyes).
1839. *Heteropoda*, Anton, Verzeich. Conch., p. 27.

1841. *Nucleobranchiata*, d'Orbigny, Sagra's Hist. Cuba, Moll., vol. i. p. 93.
1841. *Heteropoda*, Cantraine, Malacol. Médit., p. 35.
1841. *Nucleobranchiata*, Reeve, Proc. Zool. Soc. Lond., p. 74.
1842. ,, *id.*, Conch. Syst., vol. ii. p. 55.
1842. ,, d'Orbigny, Pal. franç. Terr. Crét., vol. ii. p. 16.
1843. ,, Forbes, Report Brit. Assoc., p. 132.
1843. *Heteropoda*, Gravenhorst, Vergleich. Zool., p. 65.
1843. *Heteropoden*, Oken, Lehrbuch Naturphil., ed. 3, p. 459.
1845. *Nucleobranchiata*, Geinitz, Grundriss der Verstein., p. 317.
1845. ,, Catlow, Conch. Nomencl., p. 116.
1845. *Heteropoda*, Gravenhorst, Das Thierr. nach d. Verwandt., p. 33.
1847. ,, Lovèn, Öfversigt k. Vetensk.-Akad. Förhandl., p. 191 (Dentition).
1850. *Heteropods*, Johnston, Introd. Conch., pp. 106, 118, 119.
1850. *Nucleobranchiata*, Jay, Cat. Shells, ed. 4, p. 114.
1852. *Heteropoda*, Huxley, Ann. and Mag. Nat. Hist., vol. x. p. 455 (Anatomy).
1852. *Hétéropodes*, Souleyet, Voy. "Bonite" Zool., vol. ii. p. 289.
1853. ,, Verany, Journ. de Conchyl., vol. iv. p. 381.
1853. *Heteropoden*, Gegenbaur, Zeitschr. f. wiss. Zool., Bd. iv. p. 335 (Anatomy).
1853. *Heteropoda*, Philippi, Handbuch Conch., p. 281.
1854. *Heteropoden*, Leuckart, Zool. Untersuch., Heft iii. pp. 3–68.
1854. *Nucleobranchiata*, Woodward, Man. Moll., pp. 197, 451.
1854. *Heteropoden*, Gegenbaur, Zeitschr. f. wiss. Zool., Bd. v. p. 113 (On the Excretory Organ).
1855. ,, *id.*, Untersuch. Pteropoden und Heteropoden, pp. 101–185, 213.
1856. ,, Krohn, Archiv f. Anat. u. Physiol., pp. 515–522 (Development).
1856. *Heteropoda*, Troschel, Gebiss d. Schneck., vol. i. pp. 39–46.
1857. ,, Gray, System. Arrang. Moll., p. 131.
1857. *Heteropoden*, Krohn, Müller's Archiv f. Anat. u. Physiol., p. 466 (Development).
1858. *Heteropoda*, Owen, Encycl. Brit., vol. xv. p. 375.
1860. *Nucleobranchiata*, Reeve, Elements Conch., vol. ii. p. 42.
1860. *Heteropoden*, Krohn, Beiträge Entwick. Pterop. und Heterop., p. 4.
1866. *Heteropoda*, Keferstein, Bronn's Thierreich, vol. iii. pt. 2, pp. 809–852.
1869. *Heteropoden*, Boll, Beiträge vergl. Histiol. Moll., pp. 6, 57, 75, 97.
1873. ,, Weinkauff, Cat. Europ. Meer. Conch., p. xiii.
1876. *Hétéropodes*, Fol, Arch. d. Zool. Expér., vol. v. p. 105, pl. 1–4 (Development).
1876. *Heteropoden*, Claus, Archiv f. mikrosk. Anat., vol. xii. p. 103, pl. x. (On the Organ of Hearing).
1878. ,, *id.*, *op. cit.*, vol. xv. p. 341, pl. xxi. (On the Acoustic Apparatus in the Organ of Hearing).

1878. *Heteropoda*, Kobelt, Illust. Conchylienbuch, p. 25.
1880. „ Hutton, Man. New Zeal. Moll., p. 118.
1883. „ Fewkes, Amer. Natur., vol. xvii. p. 206 (The Sucker on the Fin not a Sexual Characteristic).
1883. *Azygobranchia*, section *Natantia*, Lankester, Ency. Brit., vol. xvi. p. 653.
1883. *Nucleobranchiates*, Amer. Cyclopæd., vol. xii. p. 530.
1883. *Nucleobranchiata*, Tyron, Struct. Syst. Conch., vol. ii. p. 347.
1883. „ Fischer, Man. Conch., p. 575.
1884. „ Grasset, Index Test. vivent., p. 146.
1885. *Heteropoden*, Paneth, Archiv f. mikrosk. Anat., vol. xxiv. pp. 230–288, pls. xiv.–xvi. (Histology).
1886. „ Grenacher, Abhandl. d. naturf. Gesellsch. zu Halle, vol. xvii., two plates (On the Eyes).

Family I. Pterotracheidæ.

1810. *Pteropoda* (*partim*), Péron et Lesueur, Ann. Mus. Hist. Nat., vol. xv. pp. 58, 64.
1814. *Ptrachidia*, Rafinesque-Schmaltz, Précis des découv., p. 29.
1822. *Ptérotrachées*, Férussac, Tab. Syst., p. xxvii.
1824. *Nectopoda*, Blainville, Dict. d. Sci. Nat., vol. xxxii. p. 282.
1825. „ *id.*, Man. Moll., p. 491.
1829. *Firolides*, Rang, Man. Moll., p. 120.
1830. „ Deshayes, Ency. Méth., vol. ii. p. 130.
1830. *Ptérotrachées*, *id.*, Ency. Méth., vol. iii. p. 860.
1832. *Firolidæ*, Wiegmann and Ruthe, Handb. d. Zool., p. 518.
1833. *Pterotracheen*, Oken, Naturgesch., vol. iv. p. 553.
1836. *Nucleobranchideæ*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 139.
1838. *Firolides*, Potiez and Michaud, Gal. Moll., vol. i. p. 47.
1840. *Pterotracheidæ*, Gray, Synop. Brit. Mus., p. 148.
1841. „ *id.*, *loc. cit.*, p. 126.
1841. *Carinariana*, Reeve, Proc. Zool. Soc. Lond., p. 74.
1842. *Firolidæ*, d'Orbigny, Paléont. Franç., Terr. crét., vol. ii. p. 18.
1843. *Pterotracheidæ*, Gray, Dieffenbach's New Zeal., p. 244.
1843. *Pterotracheen*, Oken, Lehrbuch Naturphil., ed. 3, p. 459.
1844. *Pterotracheidæ*, Gray, Rev. Zool., p. 358.
1846. *Firolina*, Agassiz, Nomen. Zool. Univ., p. 155.
1846. *Pterotracheoidæ*, *id.*, *op. cit.*, p. 315.
1850. *Pterotracheidæ*, Gray, Fig. Moll. Anim., vol. iv. p. 99.
1852. *Firoles*, Milne-Edwards, Ann. d. Sci. Nat., vol. xvii. p. 146 (On the Auditory Organ)
1854. *Firolidæ*, Woodward, Man. Moll., p. 199.
1854. *Pterotracheidæ*, H. and A. Adams, Gen. Moll., vol. ii. p. 92.
1855. { *Firolida*, / *Carinarida*, } Gegenbaur, Untersuch. Pterop. und Heterop., p. 214.
1856. *Firoliden*, Krohn, Müller's Archiv f. Anat. Physiol., p. 520 (Development).

1856. { *Carinariacea*, / *Firolacea*, } Troschel, Gebiss d. Schneck., vol. i. p. 43.
1857. *Pterotracheidæ*, Gray, Syst. Arrang. Moll., p. 131.
1859. *Firolidæ*, Chenu, Man. Conch., vol. i. p. 122.
1866. *Pterotracheacea*, Keferstein, Bronn's Thierreich, vol. iii. pt. 2, p. 850.
1868. *Firolidæ*, Weinkauff, Conch. Mittelm., vol. ii. p. 431.
1871. „ Rattray, Trans. Linn. Soc. Lond., vol. xxvii. p. 255, pls. xliii., xliv. (Anatomy, Physiology, Distribution).
1880. „ Hutton, Man. New Zeal. Moll., p. 118.
1883. „ Tryon, Struct. Syst. Conch., vol. ii. p. 348.
1883. { *Pterotracheacea*, / *Carinariacea*, } Lankester, Ency. Brit., vol. xvi. p. 654.
1883. { *Pterotracheidæ*, / *Carinariidæ*, } Fischer, Man. Conch., p. 578.
1884. *Carinariidæ*, Grasset, Index Test. vivent., p. 146.

Genus *Pterotrachea*, Forskål.

1775. *Pterotrachea*, Forskål, Descrip. Anim., p. 112.
1789. „ Gmelin, Syst. Nat., vol. vi. p. 3137.
1791. *Firola*, Bruguière, Tab. Ency. et méth., vol. i. pl. lxxxviii.
1801. *Pterotrachea*, Lamarck, Syst. des Anim., p. 61.
1803. *Pterotrachée*, Bosc, Nouv. dict. Hist. Nat., vol. viii. p. 483.
1805. *Pterotrachea*, Roissy, Hist. Nat. (Suite à Buffon), vol. v. p. 78.
1810. *Firola*, Péron et Lesueur, Ann. du Mus., vol. xv. pp. 64, 70–6.
1812. *Firole*, Lamarck, Extrait du cours de Zool., p. 125.
1814. *Hypterus*, Rafinesque-Schmaltz, Précis des decouv., p. 29.
1816. *Firole*, Blainville, Bull. Soc. Philom. Paris, p. 30.
1817. „ Lesueur, Bull. Soc. Philom. Paris, p. 157.
1817. *Firola*, *id.*, Journ. Acad. Nat. Sci. Philad., vol. i. p. 3.
1817. *Pterotrachea*, Bosc, Nouv. dict. Hist. Nat., vol. xi. p. 530.
1818. *Firola*, Oken, Isis, p. 1557.
1820. *Pterotrachea*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 62.
1821. „ Chamisso, Nova Acta Acad. Leop. Carol., vol. x. pt. 2, p. 346.
1821. „ Gray, London Medical Repository, 1821, vol. xv. p. 235.
1822. „ Lamarck, Anim. sans Vert., vol. vii. p. 675; ed. 2, vol. xi. p. 381.
1822. *Firola*, Férussac, Tab. Syst., p. xxxvii.
1824. *Pterotrachea*, Blainville, Dict. d. Sci. Nat., vol. xxxii. p. 282.
1825. „ *id.*, Man. Mal., p. 491.
1825. „ Chiaje, Mem. Stor. Anim. senza Vert., vol. ii. p. 193.
1825. „ Eschscholtz, Oken's Isis, p. 736.
1826. *Pterotrachea*, Risso, Hist. nat. Europ., vol. iv. p. 28.
1828. „ Heusinger, Zeitschr. f. Organ. Phys., vol. ii. p. 194–6.
1829. „ Chiaje, Mem. Stor. Anim. senza Vert., vol. iv. p. 197.
1829. *Firola*, Rang, Man. Moll., p. 120.
1830. „ Cuvier, Règne Anim., ed. 2, vol. iii. p. 69.
1830. *Pterotrachea*, Bosc, Hist. nat., vers, ed. 2, vol. i. p. 63.
1830. „ Deshayes, Ency. Méth., vol. ii. p. 127; 1832, vol. iii. p. 859.
1830. *Hiptère*, *id.*, *loc. cit.*, vol. ii. p. 284.

1832. *Pterotrachea*, Wiegmann and Ruthe, Handb. d. Zool., p. 518.
1834. *Firola*, Gray, Griffith's Anim. King., vol. xii. p. 51.
1835. *Pterotrachea*, Oken, Naturgesch., vol. v. p. 513.
1836. *Firola*, d'Orbigny, Voy. Amér. mérid., vol. v. pp. 145, 150.
1836. *Anops*, *id.*, *op. cit.*, p. 140.
1838. *Firola*, Potiez and Michaud, Galer. Moll., vol. i. p. 47.
1838. „ Eydoux and Souleyet, L'Institut, vol. vi. p. 376 (Auditory Organ).
1841. „ Cantraine, Mal. Medit., p. 42.
1841. *Pterotrachea*, Chiaje, Descriz. e notom. anim. invert. Sicil., vol. ii. p. 93.
1842. „ Gray, Synopsis Brit. Mus., pp. 65, 90.
1842. *Firola*, d'Orbigny, Paléont. franç., Terr. crét., vol. ii. p. 18.
1842. *Anops*, d'Orbigny, *loc. cit.*, p. 18.
1843. *Firola*, Forbes, Rep. Brit. Assoc., p. 132.
1843. *Pterotrachea*, Chiaje, Rendicont. Accad. Sci. Soc. Borbon. Napoli, vol. ii. p. 106.
1850. *Firole*, Huxley, Ann. d. Sci. Nat., vol. xiv. p. 193.
1850. *Pterotrachea*, Gray, Fig. Moll. Anim., vol. iv. p. 100.
1850. *Anops*, *ibid.*, *loc. cit.*, p. 100.
1852. *Firola*, Souleyet, Voy. "Bonite," Zool., vol. ii. p. 345.
1853. „ Leuckart, Wiegmann's Archiv f. Naturgesch., p. 253.
1853. *Pterotrachea*, Philippi, Handbuch Conch., p. 284.
1853. *Anops*, *id.*, *op. cit.*, p. 284.
1854. *Firola*, Woodward, Man. Moll., p. 199.
1854. „ Leuckart, Zool. Untersuch., Theil iii. pp. 3–68.
1855. *Pterotrachea*, Untersuch. Pterop. und Heterop., pp. 153, 214.
1855. „ H. and A. Adams, Gen. Moll., vol. ii. p. 94.
1856. „ Troschel, Gebiss d. Schneck., vol. i. p. 44.
1856. „ Krohn, Müller's Archiv f. Anat. Physiol., p. 520.
1857. „ Gray, Syst. Arrang. Moll., p. 131.
1857. *Anops*, *id.*, *op. cit.*, p. 131.
1859. *Firola*, Chenu, Man. Conch., vol. i. p. 123.
1859. *Anops*, *id.*, *op. cit.*, p. 123.
1860. *Pterotrachea*, Krohn, Beiträge Entwick. Pterop. und Heterop., p. 28.
1863. *Firola*, Macdonald, Trans. Roy. Soc. Edin., vol. xxiii. p. 189, pl. ix. fig. 4 (Anatomy).
1866. *Pterotrachea*, Keferstein, Bronn's Thierreich, vol. iii. pt. 2, p. 850.
1869. „ Boll, Beiträge vergleich. Histiol. Moll., p. 11.
1871. *Firola*, Macdonald, Quart. Journ. Micr. Sci. (series 2), vol. xi. p. 274, woodcut (buccal teeth).
1873. *Pterotrachea*, Weinkauff, Cat. Europ. Meer. Conch., p. 44.
1875. „ Ranke, Zeitschr. f. wiss. Zool., Suppl. Bd. xxv. p. 77, pl. v. (On the Auditory Organ).
1876. „ *id.*, Archiv f. mikrosk. Anat., vol. xii. p. 564 (On the Acoustic Organ of the Ear).
1876. „ Fol, Arch. d. Zool. Expér., vol. v. pp. 105–158 (Development).
1877. „ Edinger, Archiv f. mikrosk. Anat., vol. xiv. p. 171, pl. xi. (Anatomy).
1883. *Firola*, Tryon, Struct. Syst. Conch., vol. ii. p. 349.
1883. *Pterotrachea*, Fischer, Man. Conch., p. 579.
1886. „ Warlomont, Journ. Anat. et Physiol., vol. xxii. pp. 331–343 (Anatomy).

The determination of the species of the shell-less Heteropods is extremely difficult. Many of the forms of *Pterotrachea* are most unsatisfactorily determined; some are past

recognition, either through the inadequacy of the descriptions or the rough inaccurate character of the figures which are supposed to represent them. Of the first four species described, *Pterotrachea coronata*, *Pterotrachea pulmonata*, *Pterotrachea aculeata*, and *Pterotrachea hyalina* of Forskål, only the first has since been recognised. Even the figure of that species is extremely crude and fanciful. Nothing is known of the three others beyond the information given by Forskål, and since this is so incomplete and the figures so bad, I think it would certainly be advisable to reject these so-called species as beyond recognition.

The next to describe some species belonging to this genus was Lesueur, who in 1817 published short diagnoses and figures of six so-called new species, which he separated on account of the presence or absence of a fin-sucker, the want or possession of the caudal appendage, and the number of "gelatinous points" or denticles in front of the eyes. The stability of these species has been doubted by d'Orbigny and others, and it seems to me probable that in three or four instances only varieties or different sexes of the same species are depicted. Quoy and Gaimard and Risso have also described and figured species which probably will never be recognised, and of several other forms nothing is known except the original figures and descriptions, some of which evidently are inaccurate and incomplete. Still, as it is impossible to relegate them with absolute certainty as synonyms of well-recognised forms, I think it best to let them stand as separate species until it can be shown beyond a doubt what their true position is. It is dangerous to deny or doubt the existence or value of a species because we do not happen to have had the opportunity of examining or possessing an example. Although we may feel most confident that a certain so-called new species is either identical or merely a variety of some well-established form, still we are not warranted in "sinking" an author's species (as is often done by certain writers) upon mere suspicion. It is an injustice, and creates endless confusion in the nomenclature.

In the following list the species are not arranged in the order of their apparent affinity, but merely according to priority of date of publication :—

Pterotrachea coronata, Forskål.

1775.	*Pterotrachea coronata*,	Forskål, Descript. Anim., p. 117.
1776.	„	„	*id.*, Icones, p. 10, pl. xxxiv. fig. A.
1789.	„	„	Gmelin, Syst. Nat., p. 3137.
1791.	„	„	Bruguière, Ency. Méth., pl. lxxxviii. fig. 1 (copy of Forskål).
1801.	„	„	Lamarck, Syst. Anim., p. 61.
1805.	„	„	Roissy, Hist. Nat. (Suite à Buffon), vol. v. p. 79.
1822.	„	„	Lamarck, Anim. sans Vert., vol. vii. p. 676; ed. 2, vol. xi. p. 383.
1826.	„	„	Risso, Hist. nat. Europ., vol. iv. p. 28.
1829.	„	„	Chiaje, Mem. Stor. Anim. senza Vert., vol. iv. pp. 182, 197.
1830.	„	„	Bosc, Hist. nat., vers, ed. 2, vol. i. p. 64.

1830. *Pterotrachea coronata*, Deshayes, Ency. Méth., vol. ii. p. 129.
1830. *Firola coronata*, Cuvier, Règne anim., ed. 2, vol. iii. p. 69.
1835. *Pterotrachea coronata*, Oken, Naturgesch., vol. v. p. 514.
1841. „ „ Chiaje, Descriz. e Notom. Anim. Invert. Sicil., vol. ii. p. 93, pl. lxv.
1841. *Firola coronata*, Cantraine, Mal. Médit., p. 43.
1843. *Pterotrachea coronata*, Chiaje, Rendiconto Accad. Sci. Soc. Borbon. Napoli, vol. ii. p. 106.
1844. „ „ Philippi, Enum. Moll. Sicil., vol. ii. p. 204, pl. xxviii. fig. 15.
1850. „ „ Gray, Fig. Moll. Anim., pl. clix. fig. 1 (copy of Philippi).
1850. „ „ *id.*, *loc. cit.*, pl. clvii. fig. 1 (copy of Chiaje).
1850. „ „ *id.*, *loc. cit.*, pl. clviii. fig. 3 (copy of Forskål).
1851. *Firola coronata*, Leydig, Zeitschr. f. wiss. Zool., Bd. iii. p. 328 (Anatomy).
1853. „ „ Vérany, Journ. de Conch., vol. iv. p. 381.
1854. „ „ Leuckart, Zool. Untersuch., Heft iii. pp. 3–68, pl. i.
1855. *Pterotrachia coronata*, Gegenbaur, Untersuch. Pterop. und Heterop., p. 215, pl. vii. fig. 6.
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 94.
1856. „ „ Troschel, Gebiss d. Schneck., vol. i. p. 44, pl. ii. fig. 12.
1866. „ „ Keferstein, in Bronn's Thierreich, vol. iii. pt. 2, pl. lxviii. fig. 15 (Odontophore); pl. lxx. figs. 2, 10–14.
1876. „ „ Fol, Arch. d. Zool. Expér., vol. v. p. 107, pl. iv. figs. 9–15 (Development).

Habitat.—Mediterranean.

Pterotrachea cuviera (Péron et Lesueur).

1810. *Firole cuvier*, Péron et Lesueur, Ann. Mus. Hist. Nat., vol. xv. p. 69, pl. ii. fig. 8.
1817. *Firola cuviera*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 7, pl. i. fig. 4.
1817. „ „ *id.*, Bull. Soc. Philom. Paris, p. 159.
1818. „ „ Oken, Isis, p. 1559.
1820. *Pterotrachea cuviera*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 67.
1821. „ *cuvierii*, Chamisso, Nova Acta Acad. Leop. Carol., vol. x. pt. 2, p. 346.
1825. „ „ Eschscholtz, Isis, p. 736.
1827. „ *peronii*, Ency. Méth., pl. ccccclxi. fig. 1 (copy of Lesueur).
1850. „ *coronata* (*partim*), Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clx. fig. 1 (copy of Lesueur).

Habitat.—Mediterranean (Lesueur).

Pterotrachea peronia (Lesueur).

1817. *Firola peronia*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 7, pl. i. fig. 6.
1817. „ *peroniana*, *id.*, Bull. Soc. Philom. Paris, p. 159.
1818. „ „ Oken, Isis, p. 1559.
1820. *Pterotrachea peronia*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 67.
1850. „ *coronata* (*partim*), Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clx. fig. 6 (copy of Lesueur).

Habitat.—Mediterranean.

Pterotrachea gibbosa (Lesueur).

1817. *Firola gibbosa*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 6, pl. i. fig. 2.
1817. „ „ *id.*, Bull. Soc. Philom. Paris, p. 159.
1818. „ „ Oken, Isis, p. 1559.
1820. *Pterotrachea gibbosa*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 66.
1850. „ *coronata* (*partim*), Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clx. fig. 4 (copy of Lesueur).

Habitat.—Mediterranean (Lesueur).

Pterotrachea frederica (Lesueur).

1817. *Firola frederica*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 7, pl. i. fig. 5.
1817. „ „ *id.*, Bull. Soc. Philom. Paris, p. 159.
1818. „ „ Oken, Isis, p. 1559.
1820. *Pterotrachea frederica*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 67.
1825. „ (*Firola*) *frederici*, Blainville, Man. Malacol., p. 492, pl. xlvii. fig. 4.
1826. „ *peronii* (*non* Lesueur), Ency. Méth., pl. cccclxiv. fig. 1.
1830. *Firola frederica*, Cuvier, Règne anim., ed. 2, vol. iii. p. 69, note.
1841. „ „ Cantraine, Mal. Médit., p. 43.
1843. „ „ Forbes, Report Brit. Assoc., p. 132.
1844. *Pterotrachea fredericia*, Philippi, Enum. Moll. Sicil., vol. ii. p. 204.
1850. „ *frederica*, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clx. fig. 3 (copy of Lesueur).
1850. „ „ *id.*, *op. cit.*, p. 100, pl. clvii. fig. 2 (copy of Chiaje).
1850. „ *coronata* (*partim*), *id.*, *loc. cit.*, p. 100, pl. clv. fig. 7 (copy of Blainville).
1853. *Firola fredericiana*, Vérany, Journ. de Conchyl., vol. iv. p. 381.
1854. „ „ Leuckart, Zool. Untersuch., Heft iii. pp. 3–68, pls. i., ii.
1855. *Pterotrachea friderici*, Gegenbaur, Untersuch. Pterop. und Heterop., p. 215, pl. vii.
1855. „ *frederica*, H. and A. Adams, Gen. Moll., vol. ii. p. 94.
1856. „ *fridericiana*, Troschel, Gebiss d. Schneck., vol. i. p. 44, pl. ii. fig. 11.
1866. „ *fredericiana*, Keferstein, Bronn's Thierreich, vol. iii. pt. 2, pl. lxix. figs. 9, 10.
1876. „ *frederici*, Fol, Arch. d. Zool. Expér., vol. v. p. 107, pl. iv. fig. 3 (Development).
1886. *Firola frederici*, Warlomont, Journ. Anat. et Physiol., vol. xxii. p. 349, pl. xii. figs. 1–4 (Anatomy).

Habitat.—Mediterranean.

Pterotrachea forskalia (Lesueur).

1817. *Firola forskalia*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 7, pl. i. fig. 3.
1817. „ *forskalea*, *id.*, Bull. Soc. Philom. Paris, p. 159.
1818. „ „ Oken, Isis, p. 1559.
1820. *Pterotrachea forskalia*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 66, pl. xlvii. fig. 4.
1850. „ *coronata*, Forskål, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clx. fig. 5 (copy of Lesueur).

Habitat.—Mediterranean (Lesueur).

Pterotrachea mutica (Lesueur).

1817. *Firola mutica*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 6, pl. i. fig. 1.
1817. „ „ *id.*, Bull. Soc. Philom. Paris, p. 159.
1818. „ „ Oken, Isis, p. 1559.
1820. *Pterotrachea mutica*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 66.
1841. *Firola mutica*, Cantraine, Mal. Médit., p. 44.
1844. *Pterotrachea mutica*, Philippi, Enum. Moll. Sicil., vol. ii. p. 204.
1853. *Firola mutica*, Vérany, Journ. de Conchyl., vol. iv. p. 381.
1854. „ „ Leuckart, Zool. Untersuch., Heft. iii. pp. 3–68, pl. i.
1855. *Pterotrachea mutica*, H. and A. Adams, Gen. Moll., vol. ii. p. 94.
1855. „ „ Gegenbaur, Untersuch. Pterop. und Heterop., p. 215.
1856. „ „ Troschel, Gebiss d. Schneck., vol. i. p. 45, pl. ii. figs. 13, 13*a*.
1866. „ „ Keferstein, in Bronn's Thierreich, vol. iii. pt. 2, p. 69, fig. 1; pl. lxx. fig. 1.
1876. „ „ Fol, Arch. d. Zool. Expér., vol. v. p. 107, pl. iv. figs. 4–8 (Development).
1883. „ „ Lankester, Ency. Brit., vol. xvi. p. 654, fig. 51 (copy of Keferstein reversed).

Habitat.—Mediterranean (Lesueur).

Pterotrachea rufa, Quoy and Gaimard.

1824. *Pterotrachea rufa*, Quoy and Gaimard, Voy. "Uranie" et la "Physicienne," Zool., p. 491, pl. lxxxvii. figs. 2, 3.
1827. „ „ Oken, Isis, p. 1016.
1833. „ „ Oken, Isis, p. 187, pl. vi. figs. 2, 3 (reversed copy of Quoy and Gaimard).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 94.

Habitat.—Indian Ocean (Quoy and Gaimard).

Pterotrachea lesueuri, Risso.

1826. *Pterotrachea lesueri*, Risso, Hist. nat. Europ., vol. iv. p. 29, pl. ii. fig. 14.
1850. „ „ Gray, Fig. Moll. Anim., pl. clix. fig. 4 (copy of Risso).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 94.

Habitat.—Mediterranean.

Pterotrachea adamastor, Lesson.

1830. *Pterotrachea adamastor*, Lesson, Voy. "Coquille," Zool., vol. ii. p. 249, pl. iii. fig. 1, *g.n.*
1850. „ *coronata*, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clvi. fig. 1 (copy of Lesson, reduced).
1855. „ *adamastor*, Küster, Conch. Cab., Heteropoda, pl. i. fig. 3 (copy of Lesson).

Habitat.—Near the Cape of Good Hope (Lesson).

Pterotrachea hippocampus, Philippi.

1829. *Pterotrachea hyalina*, Chiaje, Mem. Stor. Anim. senza Vert., vol. iv. pp. 183, 198, pl. xlvii. fig. 13.
1829. „ *frederici*, Chiaje, *loc. cit.*, pp. 184, 198, pl. lxix. fig. 2.
1836. „ *hippocampus*, Philippi, Moll. Sicil., vol. i. p. 242; vol. ii. p. 204, pl. xxviii. fig. 16.
1841. „ *fredericiana*, Chiaje, Descriz. e Notom. Anim. Invert. Sicil., vol. ii. p. 93.
1843. „ *frederici*, *id.*, Rendicont. Accad. Sci. Soc. Borbon. Napoli, vol. ii. p. 106.
1850. „ *frederica* (*part.*), Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clvii. fig. 2 (copy of Chiaje).
1850. „ *hyalina*, Gray, *loc. cit.*, pl. clvii. fig. 3.
1850. „ *hippocampus*, Gray, *loc. cit.*, pl. clv. fig. 5 (copy of Philippi).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 94, pl. lxix. fig. 7 (copy of Philippi).
1855. „ *hyalina*, H. and A. Adams, *loc. cit.*, p. 94.
1855. „ „ Gegenbaur, Untersuch. Pterop. und Heterop., p. 215.

Habitat.—Mediterranean.

In placing with this species *Pterotrachea frederici* and *Pterotrachea hyalina* of Chiaje, which are evidently distinct from the species described under those names by Lesueur and Forskål respectively, I have followed Philippi.

Pterotrachea quoyana (d'Orbigny).

1836. *Firola quoyana*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 150, pl. xi. figs. 1, 2.
1850. *Pterotrachea quoyana*, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. lxii. figs. 1, 1*a* (copy of d'Orbigny).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 94.
1859. „ „ Chenu, Man. Conch., vol. i. p. 123, fig. 536 (after d'Orbigny reversed).
1883. *Firola quoyana*, Tryon, Struct. Syst. Conch., vol. ii. pl. lxxxvi. fig. 97 (copy of d'Orbigny reversed and reduced).

Habitat.—South Atlantic (d'Orbigny).

Pterotrachea edwardsii (Deshayes).

1836–1846. *Firola edwardsii*, Deshayes, Cuvier's Règne Anim. Moll., pl. xxxix. fig. 1.
1850. *Pterotrachea edwardsii*, Gray, Fig. Moll. Anim., pl. clix. fig. 2 (copy of Deshayes).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 94.

Habitat.—Mediterranean (Deshayes).

Pterotrachea umbilicata, Chiaje.

1841. *Pterotrachea umbilicata*, Chiaje, Descriz. e Notom. Anim. Invert. Sicil., vol. ii. p. 94, pl. lxiv. figs. 12–14.
1843. „ „ *id.*, Rendicont. Accad. Sci. Soc. Borbon. Napoli, vol. ii. p. 107.

Habitat.—Mediterranean.

Pterotrachea keraudrenii (Eydoux and Souleyet).

1841. *Firole de keraudren*, Eydoux and Souleyet, Voy. "Bonite," Atlas, pl. xvi. figs. 8–10.
1847. *Firola keraudrenii*, Chenu, Leçons élém. Hist. nat., p. 130, fig. 417 (reduced copy of Eydoux and Souleyet).
1850? „ „ Deshayes, Traité Conch., pl. cii. fig. 6 (copy of Eydoux and Soulèyet).
1850. *Pterotrachea keraudrenii*, Gray, Fig. Moll. Anim., pl. ccxxxviii. fig. 3 (copy of Eydoux and Souleyet).
1852. *Firola keraudrenii*, Souleyet, Voy. "Bonite," Zool., vol. ii. p. 349.
1855. *Pterotrachea keraudrenii*, H. and A. Adams, Gen. Moll., vol. ii. p. 94.

Habitat.—Mid Atlantic (Eydoux and Souleyet).

Pterotrachea scutata, Gegenbaur.

1855. *Pterotrachea scutata*, Gegenbaur, Untersuch. Pterop. und Heterop., pp. 185, 215, pl. viii. figs. 19, 20.

Habitat.—Messina (Gegenbaur).

Species beyond Recognition.

Pterotrachea hyalina, Forskål.

1775. *Pterotrachea hyalina*, Forskål, Descrip. Anim., p. 118.
1776. „ „ *id.*, Icones, p. 10, pl. xxxiv. fig. B.
1789. „ „ Gmelin, Syst. Nat., vol. vi. p. 3137.
1791. „ „ Bruguière, Ency. Méth., pl. lxxxviii. fig. 2 (copy of Forskål).
1805. „ „ Roissy, Hist. Nat. (Suite à Buffon), vol. v. p. 79.
1817. *Firole transparente*, Bosc, Nouv. Dict. Hist. Nat., vol. xi. pl. D.xx. fig. 11 (reversed copy of Forskål).
1822. *Pterotrachea hyalina*, Lamarck, Anim. sans Vert., vol. vii. p. 676; ed. 2, vol. xi. p. 384.
1825. „ „ Eschscholtz, Isis von Oken, p. 736.
1830. „ „ Deshayes, Ency. Méth., vol. ii. p. 130.
1830. „ „ Bosc, Hist. nat., vers, ed. 2, vol. i. p. 64, pl. ii. fig. 1 (reversed copy of Forskål).
1841. „ „ Chiaje, Descriz. e Notom. Anim. Invert. Sicil., vol. ii. p. 93.
1843. „ „ *id.*, Rendicont. Accad. Sci. Soc. Borbon. Napoli, vol. ii. p. 106.
1843. *Firola hyalina*, Forbes, Report Brit. Assoc., p. 132.

Habitat.—Not stated by Forskål. Probably Mediterranean.
This species I am inclined to think must be a small *Firoloida*.

Pterotrachea pulmonata, Forskål.

1775. *Pterotrachea pulmonata*, Forskål, Descrip. Anim., p. 118.
1776. „ „ *id.*, Icones, p. 14, pl. xliii. fig. A.
1789. „ „ Gmelin, Syst. Nat., vol. vi. p. 3137.
1791. „ „ Bruguière, Ency. Méth., pl. lxxxviii. fig. 3 (copy of Forskål).
1805. „ „ Roissy, Hist. Nat. (Suite à Buffon), vol v. p. 80.
1822. „ „ Lamarck, Anim. sans Vert., vol. vii. p. 676 ; ed. 2, vol. xi. p. 384.
1830. „ „ Deshayes, Ency. Méth., vol. ii. p. 130.
1830. „ „ Bosc, Hist. nat., vers, ed. 2, vol. i. p. 65.
1850. „ „ Gray, Fig. Moll. Anim., pl. clviii. fig. 4 (copy of Forskål).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 94.

Habitat.—(?) (Forskål).

Pterotrachea aculeata, Forskål.

1775. *Pterotrachea aculeata*, Forskål, Descrip. Anim., p. 118.
1776. „ „ *id.*, Icones, p. 10, pl. xxxiv. fig. *C.c.*
1789. „ „ Gmelin, Syst. Nat., vol. vi. p. 3137.
1791. „ „ Bruguière, Ency. Méth., pl. lxxxviii. fig. 4 (copy of Forskål).
1805. „ „ Roissy, Hist. Nat. (Suite à Buffon), vol. v. p. 80.
1822. „ „ Lamarck, Anim. sans Vert., vol. vii. p. 677 ; ed. 2, vol. xi. p. 384.
1830. „ „ Bosc, Hist. nat., vers, ed. 2, vol. i. p. 65.
1850. „ „ Gray, Fig. Moll. Anim., pl. clviii. figs. 1, 2, 5 (copy of Forskål).

Habitat.—Mediterranean (Forskål).

Pterotrachea (?).

1814. *Hypterus appendiculatus*,[1] Rafinesque-Schmaltz, Précis des decouv., p. 29.

Habitat.—Mediterranean.

Pterotrachea (?).

1814. *Hypterus erythrogaster*,[2] Rafinesque-Schmaltz, *loc. cit.*, p. 29.

Habitat.—Mediterranean.

Pterotrachea (?).

1836. *Firola* (*Anops*) *peronii*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 149, pl. x. figs. 8–10.

Habitat.—South Pacific Ocean.

Under this name d'Orbigny appears to have described a mutilated specimen of *Pterotrachea*.

[1] Considered by Chiaje synonymous with *Pterotrachea friderici*, *vide* Mem. Stor. Anim. senza Vert., vol. iv. p. 198.
[2] Placed by Chiaje with *Pterotrachea coronata*.

The following is a description of the only species of *Pterotrachea* in the Challenger collection :—

Pterotrachea sp.

Body rather long and slender, smooth, with the exception of a few flat circular spine-bearing scales which are most numerous on each side of the fin. They vary somewhat in size, the largest being about a millimetre in diameter. They are more or less regularly circular, sometimes feebly tinted with red towards the middle and pale at the margin, and the soft spine or tentacle is colourless. The margin is free all round and only the central part is attached to the integument. The proboscis is rather slender, and is marked with a thread-like line or groove, which, starting from a point a short distance from the mouth, passes between two small conical denticles in front of the eyes and terminates a little beyond. The muscular skin on the ventral side of the proboscis is clearly defined, appearing thicker and more opaque than the sides. This construction of the proboscis is the same as in other species which I have examined. The fin is situated a little nearer the nucleus than to the eyes, and has a small opaque sucker at the vertex. The caudal portion of the body, which terminates in two small transverse fins, is rather short, and is strengthened along the sides by two narrow muscular bands,

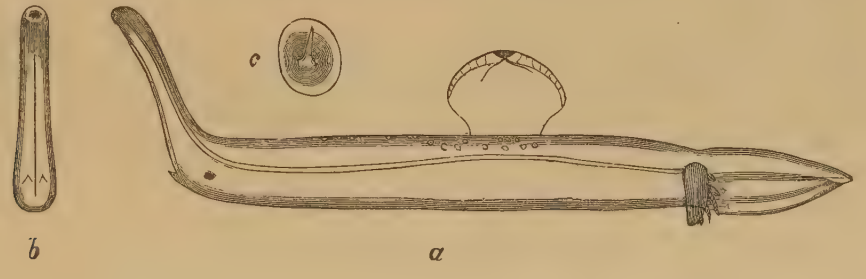

Fig. 1.—*a*, *Pterotrochea* sp.; *b*, front of rostrum ; *c*, dorsal scale (magnified).

of which the upper is the largest. The nucleus is elongate, pyriform, and supports a branchial plume of about a dozen branchlets.

Habitat.—Off Banda Island, September 29, 1874.

Besides the specimen from Banda there are three other examples in the collection, all from different parts of the Atlantic, which apparently belong to this or some closely allied species. They are, however, so mutilated that it is impossible to pronounce them the same with absolute certainty.

I have hesitated to name this species, as it presents so great a resemblance to several others which are only known to me by their figures and descriptions. It is peculiar in having only two denticles in front of the eyes, but what the specific value of this character may be I have no means of testing.

Genus *Firoloida*, Lesueur.

1817. *Firoloida*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 38.
1817. „ *id.*, Bull. Soc. Philom. Paris, p. 159.
1818. *Firoloides*, Oken, Isis, p. 1557.
1820. *Firoloida*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 67.
1824. *Firoloide*, *id.*, *op. cit.*, vol. xxxii. p. 283.
1830. *Firoloides*, Deshayes, Ency. Méth., vol. ii. p. 130.
1830. *Cerophora*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 151.
1841. „ *id.*, in Sagra's Hist. Cuba, Moll., vol. i. p. 97.
1842. „ *id.*, Paléont. franç., Terr. crét., vol. ii. p. 18.
1850. „ Gray, Fig. Moll. Anim., vol. iv. p. 100.
1852. *Firoloida*, Souleyet, Voy. "Bonite," Zool., vol. ii. p. 339.
1853. *Firoloides*, Leuckart, Wiegmann's Archiv f. Naturgesch., p. 253.
1853. *Ceratophora*, Philippi, Handbuch Conch., p. 283.
1854. *Firoloides*, Leuckart, Zool. Untersuch., Heft. iii. pp. 3–68.
1854. „ Woodward, Man. Moll., p. 199.
1855. *Firolella*, Troschel, Wiegmann's Archiv f. Naturgesch., p. 301.
1855. *Firoloides*, Gegenbaur, Untersuch. Pterop. und Heterop., p. 215.
1855. *Firoloidea*, H. and A. Adams, Gen. Moll., vol. ii. p. 95.
1856. *Firoloides*, Troschel, Gebiss d. Schneck., vol. i. p. 45.
1856. *Firolella*, *id.*, *loc. cit.*, p. 46.
1856. *Firoloides*, Krohn, Müller's Archiv f. Anat. Physiol., p. 520.
1857. *Firoloida*, Gray, Syst. Arrang. Moll., p. 132.
1857. *Cerophora*, *id.*, *loc. cit.*, p. 132.
1859. „ Chenu, Man. Conch., vol. i. p. 124.
1860. *Firoloides*, Krohn, Beiträge Entwick. Pterop. und Heterop., p. 27.
1862. „ Macdonald, Trans. Roy. Soc. Edin., vol. xxiii. p. 5.
1866. *Firoloidea*, Keferstein, Bronn's Thierreich, vol. iii. pt. 2, p. 850.
1876. *Firoloides*, Fol, Arch. d. Zool. Expér., vol. v. p. 103.
1883. „ Tryon, Struct. Syst. Conch., p. 349.
1883. { *Firoloida*, *Cerophora*, } Fischer, Man. Conch., p. 580.

There seems to be considerable diversity of opinion with regard to the value of the three so-called genera which I have united under *Firoloida* of Lesueur.

This genus was founded for a group of Heteropods which differed from *Pterotrachea*, to which they evidently were closely related, in having the visceral nucleus situated at the posterior end of the body, and scarcely any caudal prolongation beyond the nucleus. Lesueur also thought that the absence of a fin-sucker and of tentacles were essential features of his genus, but this has since been proved not to be the case.

Two of the specimens figured by Lesueur were females, as is shown by the egg-tube being represented in both of his illustrations. Neither of these has tentacles in front of the eyes. His third figure represents an animal (*Firoloida aculeata*) with two "elongate gelatinous points" in front and no egg-tube posteriorly. This I am inclined to think was a mutilated male in which the genital organ has been broken away, and the two "elongate

gelatinous points" were in reality tentacles. This opinion is strengthened by the fact that the presence of denticles in front of the eyes, which are so usual in species of *Pterotrachea*, have not since been observed in any form of *Firoloida*.

D'Orbigny was the next to describe two animals belonging to this genus, which he named *Firola* (*Cerophora*) *gaimardii* and *Firola* (*Cerophora*) *lesueurii*. The figures of these two so-called species, which were considered (probably correctly) identical by Souleyet, appear to be rather fanciful, judging by the more accurate illustrations of Eydoux and Souleyet and Macdonald, and an examination of the Challenger and other specimens, both *Firoloida gaimardii* and *Firoloida lesueurii* exhibit tentacles and doubtless were males.

Souleyet in the Voyage of the "Bonite" next described an animal which he identified with the *Firoloida desmarestii* of Lesueur. This also was a female without tentacles. He also described and figured a second example under the name *Firoloida lesueurii*, which was a male and provided with tentacles.

In 1855 Troschel characterised two new species which he believed to represent a new genus, and which he styled *Firolella*, considering it distinct from *Firoloida* in having no tentacles. It seems to me certain that he never consulted Lesueur's account of that genus, but must have based his opinion upon the writings of d'Orbigny and Souleyet. Lesueur distinctly mentions the absence of tentacles in his diagnosis of the genus.

The first of Troschel's species, *Firolella gracilis*, was a female, the second, *Firolella vigilans*, he supposed to be a male. In the latter I should have expected the presence of tentacles, but according to Troschel none existed. Their absence, I think, might possibly be due to the very young state of the animal, which was less than a quarter of an inch in length. They might not have been developed in an animal apparently so young,[1] or even have escaped observation on account of their minuteness.

The next representation of a species of *Firoloida* is that given by Macdonald, who describes and figures a male with tentacles and *a sucker on the ventral fin*, a feature not previously noted. Fewkes has since recorded the presence of a fin-sucker in females of *Firoloida lesueurii*. In the Challenger specimens and others which I have examined belonging to this genus, the males only have this organ, and also possess tentacles, the females on the contrary being destitute of both.

From these remarks it will be observed that *the presence or absence of tentacles is presumed to be a sexual and not a specific or generic character.*

Formerly the possession or want of a sucker on the fin was regarded as indicative of sex in the species of *Pterotrachea*, and a similar result might have been expected with regard to *Firoloida*. In both instances, however, it has been demonstrated by Paneth and Fewkes that the presence or absence of this character is not constant in either

[1] Krohn also regards this as a very young, recently metamorphosed, example of a *Firoloida* or *Pterotrachea*.

males or females; but it has been noticed by the former that the sucker was usually smaller in female specimens than in males.

After studying the various figures and descriptions of *Firoloida* which have been published, I have not been able to arrive at any satisfactory or definite opinion with regard to the value of the species. Whether they will eventually all resolve themselves into one or two variable forms, or how many distinct species they constitute, is uncertain. In order to arrive at a definite decision it would be necessary to have a much larger series of specimens from various localities for examination than I have had the opportunity of studying. I think then it will be the safest course to leave this question unsettled, and also not to attempt to decide which of the figured males and females should be associated together.

I might, however, point out that Macdonald has erroneously stated that *Firoloida desmarestia* is the female of *Pterotrachea keraudrenii*. The latter has a rather unusual form for a *Pterotrachea*, but still I believe it belongs to that genus, as it has a caudal prolongation, the nucleus being far from terminal, and no tentacles, the latter, if my surmise be correct, being an essential characteristic of the males of *Firoloida*, their absence, therefore, clearly showing that the animal in question was not the male of *Firoloida desmarestia*.

Firoloida desmaresti, Lesueur.

1817. *Firoloida desmarestia*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 39, pl. ii. figs. 1, 1*b*,
1817. „ „ *id.*, Bull. Soc. Philom. Paris, p. 160.
1818. *Firloïdes desmarestia*, Oken, Isis, p. 1559.
1820. *Firoloida desmarestia*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 68.
1825. *Pterotrachea* (*Firoloida*) *desmarestiana*, *id.*, Blainville, Man. Malacol., p. 492.
1850. „ „ *desmarestia*, Gray, Fig. Moll. Anim., pl. clv. fig. 8 (copy of Lesueur).
1850. „ „ „ *id.*, *op. cit.*, pl. ccxxxviii. fig. 1 (copy of Eydoux and Souleyet).
1850 ? *Firoloides desmaresti*, Deshayes, Traité Conch., pl. cii. fig. 4 (copy of Eydoux and Souleyet).
1852. *Firoloida desmarestia*, Eydoux et Souleyet, Voy. "Bonite," Zool., vol. ii. p. 342, pl. xvi. figs. 1–4.
1853. *Firloïdes desmarestii*, Huxley, Phil. Trans., vol. cxliii. pp. 30–36, pl. ii. figs. 1–8, (Anatomy).
1855. *Firoloides desmarestii*, Gegenbaur, Untersuch. Pterop. und Heterop., p. 215.
1855. *Pterotrachea desmarestina*, H. and A. Adams, Gen. Moll., vol. ii. p. 94.
1856. *Firoloides desmarestii*, Troschel, Gebiss d. Schneck., vol. i. p. 45.
1876. „ *desmaresti*, Fol, Arch. d. Zool. Expér., vol. v. p. 105, pls. i., ii., iii. (Development).

Habitat.—Atlantic, near Martinique (Lesueur); Atlantic and Pacific Oceans (Eydoux and Souleyet).

Of this species there are two males and two females in the Challenger collection, obtained on the 3rd of March 1876, at the surface, in the South Atlantic Ocean. One of the females is remarkable for the length of the filiform appendage,[1] at the end of the short caudal prolongation being considerably longer and more thread-like than that figured by Eydoux and Souleyet (Voy. "Bonite," pl. xvi. fig. 1). In the other specimen it is altogether wanting, its absence doubtless being due to accident. The male examples have much the general aspect of the females, but are at once recognised by the presence of tentacles and the genital organs behind the nucleus. This portion of the animal is fairly like the representation of that of *Firoloida lesueuri* (*op. cit.*, pl. xvi. figs. 5, 6, 7), but the narrow prolongation or caudal extremity is not so distinctly jointed as depicted in the figures. Neither of the females have a sucker on the fin, but it is present in both males. The egg-tube of one of the specimens is 10 mm. in length, and of precisely the same construction as that figured by Troschel (*Firoloida gracilis*). It contains between four hundred and four hundred and fifty ova packed together apparently without any definite arrangement.

Firoloida lesueurii (d'Orbigny).

1836. *Firola* (*Cerophora*) *lesueurii*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 151, pl. x. figs. 11, 12.
1841. *Firole de Lesueur*, Eydoux and Souleyet, Voy. "Bonite," Atlas, pl. xvi. figs. 5–7.
1850. *Pterotrachea* (*Firoloida*) *eydouxii*, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. ccxxxviii. fig. 2 (copy of Eydoux and Souleyet).
1850. *Cerophora lesueurii*, Gray, *op. cit.*, pl. lxii. fig. 4 (copy of d'Orbigny).
1852. *Firoloida lesueurii*, Souleyet, Voy. "Bonite," Zool., vol. ii. p. 343.
1853. „ „ Vérany, Journ. de Conchyl., vol. iv. p. 381.
1854. *Firoloides lesueurii*, Leuckart, Zool. Untersuch., Heft. iii. pp. 3–68, pls. i., ii.
1855. *Firoloidea eydouxii*, H. and A. Adams, Gen. Moll., vol. ii. p. 95.
1855. „ *lesueurii*, *id.*, *loc. cit.*, p. 95, pl. lxix. fig. 8 (copy of d'Orbigny).
1858. *Firoloides lesueurii*, Owen, Ency. Brit., vol. xv. p. 378, fig. 71.
1866. *Firoloidea lesueurii*, Keferstein, Bronn's Thierreich, vol. iii. pt. 2, pl. lxix. fig. 8 (reduced copy of Eydoux and Souleyet).

Habitat.—Indian and Atlantic Oceans (Eydoux and Souleyet).

A comparison of d'Orbigny's figures and description with those of Souleyet will show considerable differences in several points. This I presume induced Gray and the Messrs. Adams to believe that two distinct forms were indicated. However, as most likely d'Orbigny's figures and his account of this animal are more or less defective, it seems probable, or at all events possible, that Souleyet was right in associating his specimens with this species.

[1] Fol (*Arch. d. Zool. Expér.*, 1876, vol. v. p. 107) erroneously states that *Firoloida* has no filiform appendage. It was described and figured by Souleyet in 1852, and again by Macdonald in 1862.

Firoloida blainvilliana, Lesueur.

1817. *Firoloida blainvilliana*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 39, pl. ii. figs. 2, 2*b*.
1817. „ „ *id.*, Bull. Soc. Philom. Paris, p. 160.
1818. *Firoloides blainvilliana*, Oken, Isis, p. 1559.
1820. *Firoloida blainvilliana*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 68.
1850. *Pterotrachea* (*Firoloida*) *blainvilleana*, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clv. fig. 1 (copy of Lesueur's figure).
1855. *Pterotrachea blainvilleana*, H. and A. Adams, Gen. Moll., vol. ii. p. 94.

Habitat.—Atlantic, near Martinique (Lesueur).

Lesueur's brief description and figure is all that is known respecting this species.

Firoloida gracilis (Troschel).

1855. *Firolella gracilis*, Troschel, Archiv f. Naturgesch., p. 301, pl. xi. fig. 1.
1856. „ „ *id.*, Gebiss d. Schneck., vol. i. p. 46, pl. ii. figs. 14, 14*a*.

Habitat.—Messina (Troschel).

Firoloida gaimardii (d'Orbigny).

1836. *Firola* (*Cerophora*) *gaimardii*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 153, pl. x. figs. 13, 14.
1850. *Cerophora gaimardii*, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. lxii. fig. 3 (copy of d'Orbigny).
1855. *Firoloidea gaimardii*, H. and A. Adams, Gen. Moll., vol. ii. p. 95.
1859. *Cerophora gaimardii*, Chenu, Man. Conch., vol. i. p. 123, fig. 537 (copy of d'Orbigny reversed).

Habitat.—North Atlantic (d'Orbigny).

Firoloida aculeata, Lesueur.

1817. *Firoloida aculeata*, Lesueur, Journ. Acad. Nat. Sci. Philad., vol. i. p. 40, pl. ii. fig. 3.
1817. *Firoloida aculata*, Lesueur, Bull. Soc. Philom. Paris, p. 160.
1818. *Firoloïdes aculeata*, Oken, Isis, p. 1559.
1820. *Firoloida aculeata*, Blainville, Dict. d. Sci. Nat., vol. xvii. p. 68.
1850. „ „ Gray, Fig. Moll. Anim., pl. clv. fig. 9 (copy of Lesueur).
1855. *Firoloidea aculeata*, H. and A. Adams, Gen. Moll., vol. ii. p. 95.

Habitat.—Atlantic (Lesueur).

Firoloida vigilans (Troschel).

1855. *Firolella vigilans*, Troschel, Archiv f. Naturgesch., p. 305, pl. xi. fig. 3.
1856. „ „ *id.*, Gebiss d. Schneck., vol. i. p. 46, pl. i. fig. 4.
1859. „ „ Chenu, Man. Conch., vol. i. p. 123, fig. 538 (copy of Troschel reduced).

Habitat.—Messina (Troschel).

Firoloida sp.

1862. *Firoloides* sp., Macdonald, Trans Roy. Soc. Edin., vol. xxiii. p. 5, pl. i. figs. 1–4.

Habitat.—Bass Straits.

Firoloida sp.

1832. *Firola* sp., jun., Quoy and Gaimard, Voy. "Astrolabe," pl. xxix. fig. 17.

The specimen figured by Quoy and Gaimard appears to be a species of *Firoloida*.

Firoloida sp.

1850. *Pterotrachea* (*Firoloida*) sp., Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clv. figs. 3, 3*a*.

Nothing is known respecting this species beyond the above rough figure.

Genus *Cardiopoda*, d'Orbigny.

1836. *Cardiapoda*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 154.
1840. „ Eydoux and Souleyet, Rev. Zool., p. 233 (On the Shell).
1841. „ d'Orbigny, in Sagra's Hist. Cuba, Moll., vol. i. p. 97.
1842. *Cardiapus*, d'Orbigny, Paléont. franç., Terr. crét., vol. ii. p. 19.
1846. *Cardiopoda*, Agassiz, Index Zool. Univer., p. 66.
1850. *Cardiapoda*, Gray, Fig. Moll. Anim., vol. iv. p. 100.
1852. *Carinaroida*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 351.
1853. *Cardiapoda*, Philippi, Handbuch Conch., p. 283.
1854. „ Woodward, Man. Moll., p. 200.
1855. „ H. and A. Adams, Gen. Moll., vol. ii. p. 96.
1857. „ Gray, Syst. Arrang. Moll., p. 132.
1859. „ Chenu, Man. Conch., vol. i. p. 126.
1862. „ Macdonald, Trans. Roy. Soc. Edin., vol. xxiii. pl. i. fig. 11, pl. ii. fig. 5*c* (Dentition).
1866. „ Keferstein, Bronn's Thierreich, vol. iii. pt. 2, p. 850.
1883. „ Fischer, Man. Conch., p. 580.
1883. „ Tryon, Struct. Syst. Conch., vol. ii. p. 350.
1883. *Cardiopoda*, Lankester, Ency. Brit., vol. xvi. p. 654.

The species of *Cardiopoda* are at present very unsatisfactorily determined. Macdonald has expressed the opinion that all the described forms belong to one and the same species, and it seems to me that this may really be the case, considering that it is very probable that the different sexes have been described as separate species. After carefully studying the various accounts by Souleyet, d'Orbigny, Macdonald, Rang, and Lesson, I believe that *the sexes are indicated by the branchiæ alone.* Eydoux and Souleyet[1] figure an animal which they consider the female of *Cardiopoda placenta*,

[1] Voy. "Bonite," pl. xvii. fig. 1.

Lesson. In this it will be observed that the branchial plume extends right round the posterior side of the nucleus just as depicted in Lesson's original figure,[1] in d'Orbigny's representation of *Cardiopoda pedunculata*,[2] and also as in the only specimen in the Challenger collection. These four I am inclined to regard as females of the same species. Undoubted male *Cardiopodæ* have been figured by Eydoux and Souleyet,[3] by d'Orbigny,[4] and by Macdonald.[5] The figure of *Cardiopoda caudina* given by Rang[6] also I believe represents a male. In each instance it will be noticed that the branchiæ are on the anterior side of the nucleus, and as in the case of the females I think it very probable that only one species exists. If this opinion be correct the species known as *Cardiopoda caudina* and *Cardiopoda carinata* are the male, and those named *Cardiopoda placenta* and *Cardiopoda pedunculata* the females, of one and the same species.

The specimen obtained by the Challenger was captured off Arrou Island on

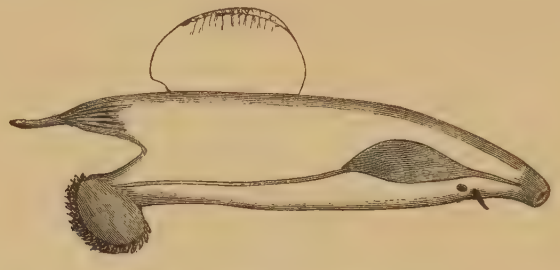

Fig. 2.—*Cardiopoda placenta*, ♀.

September 23, 1874. It is about 77 mm. in length, and has at the slender caudal extremity a small dentate sucker not nearly so large as that represented by Eydoux and Souleyet in their figure of *Cardiopoda placenta*. The tail is strengthened by muscular bands on each side as in the species of *Carinaria*, and the sucker on the ventral fin is very minute and somewhat behind the centre. It is very likely that the suckers in females will be found to be smaller than in the males, as has been shown to be the case in the species of the genus *Pterotrachea*. Besides this apparently adult example, six very small specimens representing the early stages of growth of *Cardiopoda* were obtained in the North Pacific on July 4, 1875. These are not all alike, but exhibit certain variations which may be due to difference of age or sex, but not any of them are precisely like the figures of the young as represented by Macdonald and Souleyet.

[1] Voy. "Coquille," pl. iii. fig. 2.
[2] Voy. Amér. mérid., pl. xi. fig. 5.
[3] See *Cardiopoda caudina*, Voy. "Bonite," pl. xvii. fig. 11.
[4] *Cardiopoda carinata*, Voy. Amér. mérid., pl. xi. fig. 4.
[5] *Trans. Roy. Soc. Edin.*, 1862, vol. xxiii. pl. i. fig. 10.
[6] *Mag. Zool.*, 1832, pl. v.

Cardiopoda placenta (Lesson).

1830. *Pterotrachea placenta*, Lesson, Voy. "Coquille," Zool., vol. ii. p. 253, pl. iii. fig. 2, *g.n.*
1841. *Carinaroide placenta*, Eydoux and Souleyet, Voy. "Bonite," Atlas Zool., pl. xvii. figs. 1–10.
1850. *Cardiapoda placenta*, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. ccxxxix. fig. 1 (copy of Eyd. and Soul.).
1850 ? *Carinaroides placenta*, Deshayes, Traité Conch., pl. cii. fig. 5 (copy of Eyd. and Soul.).
1852. *Carinaroida placenta*, Souleyet, Voy. "Bonite," Zool., vol. ii. p. 353.
1854. *Cardiapoda placenta*, Woodward, Man. Moll., pl. xiv. fig. 20, Shell (copy of Eyd. and Soul.).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. pp. 96, 97; vol. iii. pl. lxx. figs. 2–2*b* (copy of Eyd. and Soul.).
1858. „ „ Owen, Ency. Brit., vol. xv. p. 377, fig. 70, Shell (copy of Eyd. and Soul.).
1859. „ „ Chenu, Man. Conch., vol. i. p. 127, figs. 546–548 (copy of Eyd. and Soul.).
1866. „ „ Keferstein, in Bronn's Thierreich, vol. iii. pt. 2, pl. lxviii. figs. 12–14.
1883. „ „ Tryon, Struct. Syst. Conch., vol. ii. pl. lxxxvi. figs. 1–3 (reduced copy of Eyd. and Soul.).
1883. *Cardiopoda placenta*, Lankester, Ency. Brit., vol. xvi. p. 654, figs. 50, c., d. (same as Owen).

Habitat.—Near New Guinea (Lesson); Pacific Ocean near the Sandwich Islands, and Mid Atlantic (Eydoux and Souleyet).

Cardiopoda pedunculata, d'Orbigny.

1836. *Cardiapoda pedunculata*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 156, pl. xi. fig. 5.
1850. „ „ Gray, Fig. Moll. Anim., pl. lxii. fig. 5 (copy of d'Orbigny).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 97.
1859. „ „ Chenu, Man. Conch., vol. i. fig. 549 (copy of d'Orbigny reversed and slightly altered).

Habitat.—North Atlantic (d'Orbigny).

Cardiopoda caudina (Rang).

1832. *Firola caudina*, Rang, Mag. d. Zool., Classe v. pl. iii.
1833–44. „ „ Guérin, Icon. Règne Anim., pl. xi. fig. 3.
1850. „ „ Gray, Fig. Moll. Anim., pl. clv. fig. 6 (copy of Rang).
1850. „ „ *id.*, *loc. cit.*, pl. ccxxxix. fig. 3 (copy of Eydoux and Souleyet).
1852. *Carinaroida caudina*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 355, pl. xvii. figs. 11–18.
1855. *Cardiapoda caudina*, H. and A. Adams, Gen. Moll., vol. ii. p. 97.

Habitat.—Atlantic, near the equator (Rang); a young variety from the Pacific Ocean (Eydoux and Souleyet).

Cardiopoda carinata, d'Orbigny.

1836. *Cardiapoda carinata*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 157, pl. xi. figs. 3, 4.
1850. „ „ Gray, Fig. Moll. Anim., pl. lxii. figs. 7, 7*a* (copy of d'Orbigny).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 97.

Habitat.—Atlantic (d'Orbigny).

Cardiopoda sp., jun.

1862. *Cardiapoda* sp., jun., Macdonald, Trans. Roy. Soc. Edin., vol. xxiii. p. 17, pl. i. fig. 10.

Habitat.—South-west Pacific (Macdonald).

Cardiopoda sp.

1850. *Cardiapoda* sp., Gray, Fig. Moll. Anim., vol. iv. pp. 32, 100, pl. clv. figs. 4, 4*a*.

Habitat.—(?).

Genus *Carinaria*, Lamarck.

1766. *Patella*, Linné, Syst. Nat., ed. 12, p. 1260.
1769. *Nautilus*, Martini, Conch. Cab., vol. i. pp. 227, 239.
1783. *Argonauta*, Schrœter, Einleit., vol. i. p. 6.
1784. *Patella*, *ibid.*, *op. cit.*, vol. ii. p. 421.
1789. „ Gmelin, Syst. Nat., vol. vi. p. 3710.
1789. *Argonauta*, Gmelin, *op. cit.*, p. 3368.
1801. *Carinaria*, Lamarck, Syst. des Anim., p. 98.
1803. „ Bosc, Nouv. Dict. Hist. Nat., vol. iv. p. 355.
1809. *Carinaire*, Lamarck, Philosoph. Zool., vol. i. p. 323.
1810. *Carinaria*, Péron and Lesueur, Ann. Mus. Hist. Nat., vol. xv. pp. 59, 67.
1810. *Carinarius*, Montfort, Conch. Syst., vol. ii. p. 3.
1811. *Argonauta*, Perry, Conchol., pl. xlii.
1812. *Carinaria*, Lamarck, Extr. du cours de Zool., p. 125.
1815. „ Crouch, Introd. Conchol., p. 89.
1816. „ Bosc, Nouv. Dict. Hist. Nat., vol. v. p. 292.
1817. *Argonauta*, Dillwyn, Cat. Rec. Shells, p. 336.
1817. *Carinaria*, Blainville, Dict. d. Sci. Nat., vol. vii. p. 105.
1817. *Pterotrachea*, Cuvier, Mém. Hist. Anat. Moll., p. 28.
1820. *Carinaria*, Schweigger, Handb. Naturgesch., p. 720.
1821. „ Gray, London Medical Repos., vol. xv. p. 235.
1822. „ Férussac, Tab. Syst., p. xxxvii.
1822. „ Lamarck, Anim. sans Vert., vol. vii. p. 671.
1822. „ Bowdich, Elem. Conch., pp. 23, 72, pl. xiv. fig. 17.
1824. „ Blainville, Dict. d. Sci. Nat., vol. xxxii. p. 283.
1825. *Argonauta*, Wood, Index Test., pl. xiii.
1825. *Carinaria*, Blainville, Man. Malacol., p. 492.
1825. *Pterophora*, Caulini, *teste* Chiaje, Mem. Stor. Anim. senza Vert., vol. ii. p. 197.

1825. *Carinaire*, Latreille, Fam. Nat., p. 173.
1825. *Carinaria*, Eschscholtz, Oken's Isis, p. 736.
1826. *Pterotrachea*, Poli, Test. utrius. Sicil., vol. iii. p. 29.
1826. *Carinaria*, Risso, Hist. nat. Europ., vol. iv. p. 27.
1826. *Argonauta*, Poli, Test. utrius. Sicil., vol. iii. p. 26.
1827. *Carinaire*, Quoy and Gaimard, Ann. d. Sci. Nat., vol. x. p. 227.
1827. *Carinaria*, Rang, Bull. Sci. Nat., vol. xii. p. 339–342.
1829. „ Rang, Man. Moll., p. 121, pl. iii. figs. 1, 2. *sp.*
1830. *Carinaires*, Cuvier, Règne Anim., ed. 2, vol. iii. p. 68.
1830. *Carinaria*, Deshayes, Ency. Méth., vol. ii. p. 202.
1831. „ Vérany, Zool. Journ., vol. v. p. 325.
1832. „ Wiegmann and Ruthe, Handbuch Zool., p. 518.
1834. „ Gray, Griffith's Anim. Kingd., vol. xii. p. 50.
1835. „ Oken, Naturgesch., vol. v. p. 514.
1836. „ d'Orbigny, Voy. Amér. mérid., vol. v. p. 158.
1838. „ Potiez and Michaud, Gal. Moll., vol. i. p. 47.
1838. „ Eydoux and Souleyet, L'Institut, vol. vi. p. 376 (Auditory Organ).
1839. „ Sowerby, Conch. Man., p. 19.
1840. *Carinaires*, Milne-Edwards, Ann. d. Sci. Nat., vol. xiii. p. 195.
1840. „ *id.*, L'Institut, p. 175.
1840. *Carinaria*, Milne-Edwards and Peters, Edin. New Phil. Journ., vol. xxix. p. 169.
1841. „ Chiaje, Descriz. e Notom. Anim. Invert. Sicil., vol. ii. p. 94.
1841. „ Gray, Ann. and Mag. Nat. Hist., vol. vi. p. 239.
1841. „ Cantraine, Mal. Médit., p. 40.
1842. „ Reeve, Conch. Syst., vol. ii. p. 56.
1842. „ d'Orbigny, Paléont. franç., Terr. crét., vol. ii. p. 19.
1842. *Carinaires*, Milne-Edwards, Ann. d. Sci. Nat., vol. xviii. p. 323.
1843. *Carinaria*, Chiaje, Rendicont. Accad. Sci. Soc. Borbon. Napoli, vol. ii. p. 107.
1843. „ Forbes, Report Brit. Assoc., p. 132.
1843. „ Gravenhorst, Vergleich. Zool., p. 65.
1845. „ Lamarck, Anim. sans Vert., ed. 2, vol. xi. p. 376.
1845. „ Catlow, Conchol. Nomencl., p. 116.
1845. „ Geinitz, Grundriss der Verstein., p. 317.
1845. „ Macgillivray, Conchol. Textbook, pp. 66, 199.
1847. „ Lovén, Öfversigt k. Vetensk.-Akad. Förhandl., p. 191.
1850. „ Gray, Fig. Moll. Anim., vol. iv. p. 100.
1852. „ Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 357.
1853. „ Philippi, Handbuch Conch., p. 283.
1854. „ Woodward, Man. Moll., p. 200.
1854. „ Leuckart, Zool. Untersuch., Heft. iii. pp. 3–68.
1855. „ H. and A. Adams, Gen. Moll., vol. ii. p. 95.
1855. „ Gegenbaur, Untersuch. Pterop. und Heterop., pp. 130–153, pl. vii.
1857. „ Krohn, Müller's Archiv f. Anat. Physiol., p. 467.
1857. „ Gray, Guide Syst. Arrang. Moll., p. 132.
1859. „ Chenu, Man. Conch., vol. i. p. 125.
1860. „ Reeve, Elem. Conch., vol. ii. p. 42.
1860. „ Krohn, Beiträge Entwick. Pterop. und Heterop., pp. 36, 38.
1865. „ Reeve, Conch. Icon., vol. xv.
1866. „ Keferstein, Bronn's Thierreich, vol. iii. pt. 2, pp. 809–852.
1868. „ Hogg, Quart. Journ. Micr. Sci., vol. viii., N.S., pl. ix. fig. 25.

1868. *Carinaria*, Knocker, Proc. Zool. Soc. Lond., p. 616.
1869. „ Boll, Beiträge vergleich. Histiol. Moll., pp. 10, 59.
1873. „ Weinkauff, Cat. Europ. Meer. Conch., p. 44.
1876. „ Fol, Arch. d. Zool. Expér., vol. v. p. 105.
1880. „ Hutton, Man. New Zeal. Moll., p. 118.
1880. „ Krukenberg, Vergl. physiol. Studien, p. 177.
1883. „ Tryon, Struct. Syst. Conch., vol. ii. p. 349.
1883. „ Fischer, Man. Conch., p. 580.
1886. „ Warlomont, Journ. Anat. et Physiol., vol. xxii. p. 343, pl. xii. fig. 5 (? Larval Form).

Carinaria cristata (Linné).

1756. *Nautille vitré*, Argenville, Hist. nat. éclair. Conchyl., nouv. édit., p. 383, pl. i. fig. B.
1766. *Patella cristata*, Linné, Syst. nat., ed. xii., p. 1260.
1769. *Nautilus exiguus, vitreus dictus*, Martini, Conch. Cab., vol. i. pp. 227, 239, pl. xviii. fig. 163.
1780. *Le grand Nautile vitré*, Favanne Conchyl., vol. i. p. 719, pl. vii. fig. C2.
1783. *Argonauta No. 1*, Schrœter, Einleit., vol. i. p. 6.
1784. *Patella cristata*, Schrœter, *op. cit.*, vol. ii. p. 421.
1789. „ „ Gmelin, Syst. Nat., vol. vi. p. 3710.
1789. *Argonauta vitreus*, Gmelin, *op. cit.*, p. 3368.
1798. *Le nautile vitré*, Cubières, Hist. Abrégée Coquil., p. 197, pl. iv. fig. 8.
1801. *Carinaria vitrea*, Lamarck, Syst. des Anim., p. 99.
1810. *Carinarius vitreus*, Montfort, Conch. Syst., vol. ii. p. 3, pl. on p. 2.
1811. *Argonauta vitrea*, Perry, Conchol., pl. xlii. fig. 2.
1816. *Carinaire vitrée*, Bosc, Nouv. Dict. Hist. Nat., vol. v. pl. B 15, fig. 6.
1817. *Carinaria vitrea*, Blainville, Dict. d. Sci. Nat., vol. vii. p. 106.
1817. *Argonauta vitrea*, Dillwyn, Cat. rec. shells, p. 336.
1820. *Carinaria vitrea*, Schweigger, Handb. Naturgesch., p. 721.
1820. *Argonauta vitrea*, Rees's Cycloped. Nat. Hist., vol. v. pl. iv.
1822. *Carinaria vitrea*, Lamarck, Anim. sans Vert., vol. vii. p. 674, ed. 2, vol. xi. p. 380.
1822. „ „ Bowdich, Elem. Conch., pt. i. pl. v. fig. 16.
1823. „ „ Bory de Saint Vincent, Dict. Classique Hist. Nat., vol. iii. p. 216.
1825. „ *cristata*, Dubois, Epit. Lamarck's Test., p. 310.
1825. *Argonauta vitrea*, Wood, Index Test., pl. xiii. fig. 6.
1830. *Carinaria vitrea*, Deshayes, Ency. Méth., vol. ii. p. 205.
1840. „ „ Pfeiffer, Register Konch. Kab., p. 6.
1841. „ „ Gray, Ann. and Mag. Nat. Hist., vol. vi. p. 239.
1842. „ *gracilis*, Reeve, Ann. and Mag. Nat. Hist., vol. ix. p. 140, pl. ii. figs. 3–5.
1842. „ „ Reeve, Conch. Syst., vol. ii. pl. clviii. figs. 3–5.
1845. „ „ Catlow, Conchol. Nomen., p. 116.
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 96.
1855. „ *cristata*, H. and A. Adams, *loc. cit.*, p. 96, pl. lxx. fig. 1*a*.
1859. „ *vitrea*, Chenu, Man. Conch., vol. i. p. 125, fig. 543.
1865. „ „ Reeve, Conch. Icon., vol. xv. pl. i. fig. 2*a*–2*b*.
1866. „ „ Sowerby, Thesaur. Con., vol. iii. p. 303, pl. ccxciii. fig. 4.
1878. „ „ Kobelt, Illust. Conchylienbuch., pl. i. fig. 14.
1883. „ „ Tryon, Struct. Syst. Conch., vol. ii. pl. lxxxvi. fig. 100.

Habitat.—Indian Ocean (Reeve); Probably near the Molucca Islands (Reeve for var. *gracilis*); Amboina (Favanne).

A specimen obtained by the Challenger near Papua, and of which the anterior portion is wanting, probably belongs to this species, as the small shell agrees very well in form with the upper part of adult specimens with which I have compared it. The skin is minutely tuberculated, and the crest of the caudal extremity is rather broad and commences quite close up to the nucleus. The figure (fig. 4) represents the natural size. Three very young specimens of *Carinaria*, which probably belong to this species, were

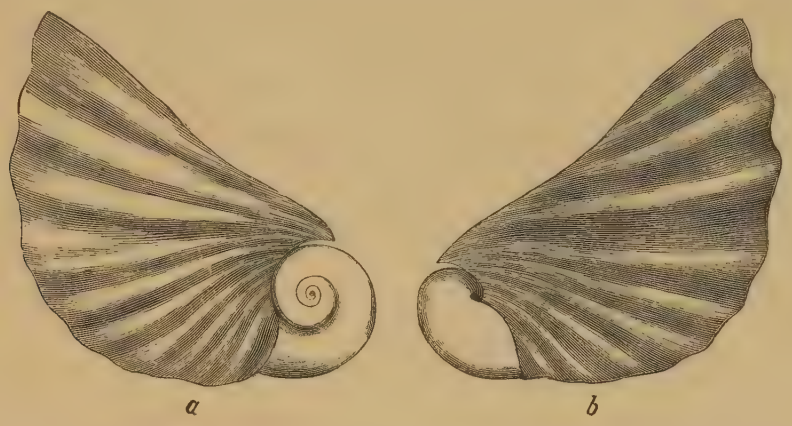

FIG. 3.—*Carinaria cristata* (young); *a*, left side; *b*, right side (magnified about seventeen diameters).

captured between the Admiralty Islands and Japan. One of these has the minute shell attached, and is represented in the accompanying woodcut. The embryonic helicoid shell is very peculiar, and it is remarkable that it has never been described as a genus of itself, as has been the case with the embryonic shells of other Gastropods.

The name most frequently applied to this species is that of *Carinaria vitrea*. This is owing to the fact that Lamarck employed it in preference to that of *cristata*, which he placed in the synonymy. There can be no question that the *Patella cristata* of Linné is

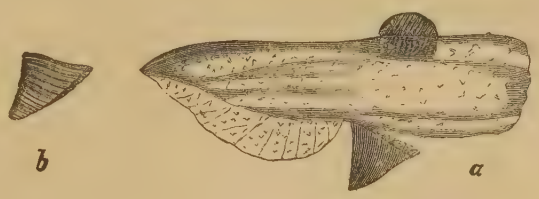

FIG. 4.—*a*, *Carinaria cristata*; *b*, shell.

undoubtedly this species, and therefore that name should be retained. The form described by Reeve as *Carinaria gracilis*, which he subsequently regarded as a variety of this species, is distinguished by the straightness of the keeled edge, which is much less curved than the typical form as represented by the figures of Argenville and others. The adult animal of *Carinaria cristata* must be of considerable dimensions, and it is remarkable that it has never been discovered.

Carinaria fragilis, Bory de Saint Vincent.

1804. *Carinaria fragilis*, Bory de Saint Vincent, Voy. dans les quatres princip. îles d'Afrique, vol. i. p. 142; Atlas, pl. vi. fig. 4.
1817. „ „ Blainville, Dict. d. Sci. Nat., vol. vii. p. 107.
1822. „ „ (*partim*), Lamarck, Anim. sans Vert., vol. vii. p. 674; ed. 2, vol. xi. p. 380.
1823. „ „ Bory de Saint Vincent, Dict. Classiques Hist. Nat., vol. iii. p. 216.
1825. „ „ (*partim*), Dubois, Epit. Lamarck's Test., p. 311.
1830. „ „ Cuvier, Règne Anim., ed. 2, vol. iii. p. 68.
1838. „ „ (*partim*), Potiez and Michaud, Gal. Moll., vol. i. p. 47.

Habitat.—Off South Africa (Bory de Saint Vincent).

The only account of this species is that given by Bory de Saint Vincent. It has been considered by some authors identical with the Mediterranean species commonly called *Carinaria mediterranea*. If only the animal had been figured and described there would have been no hesitation in pronouncing the identity of the two species; but in the description of the shell Bory de Saint Vincent points out certain features which clearly separate his species. He describes it as being "sans carène, et avec de légères stries qui, au lieu d'être circulaires, partent du sommet et arrivent au limbe en divergeant."

No other known species of *Carinaria* has radiating sculpture of that kind, but on the contrary they all exhibit similar circular or concentric plications. Still the account given by the author is so explicit that one can scarcely suppose that the radiating striæ were imaginary. The absence of a keel might be accounted for, supposing the shell to be damaged.

Carinaria lamarckii, Péron et Lesueur.

1554. *Species secunda Holoturiorum*, Rondelet, De Test., p. 126.
1858. „ „ Boussuet, De Nat. aquat. Carmen, p. 68, lower fig.
1810. *Carinaire Lamarck*, Péron and Lesueur, Ann. du. Mus., vol. xv. p. 69, pl. iii. fig. 15.
1817. *Carinaria lamarkii* (Péron et Lesueur), Blainville, Dict. d. Sci. Nat., vol. vii. p. 107.
1817. *Pterotrachée* sp., Cuvier, Mém. Moll., pl. iii. figs. 15–17.
1820–5. *Carinaria mediterranea*, Sowerby, Rec. and Foss. Shells, pl. cclxxix.
1823. „ *lamarckii*, Bory de Saint Vincent, Dict. Classique Hist. Nat., vol. iii. p. 217.
1824. „ *vitrea*, Children, Quart. Journ. Sci. Lit. and Arts, vol. xvi. p. 257, pl. vi. fig. 239 (Shell only, copy of Ency. Méth.).
1825. „ *mediterranea*, Blainville, Man. Mal., p. 493, pl. xlvii. fig. 3.
1825. *Pterotrachea lophyra*, Chiaje, Mem. Anim. sans Vert., vol. ii. p. 199, pls. xiv., xv.
1825. "*Pterotrachea navigera*, Macri, Act. Soc. Borb., vol. iii.," *teste* Chiaje, Mem., vol. ii. p. 198.
1825. "*Pterophora conchacea*, Caulini, Moll. Crat. Neap., pl. i. figs. 1–4," *teste* Chiaje, Mem., vol. ii. p. 197.
1826. *Pterotrachea lophyra*, Poli. Test. utrius. Sicil., vol. iii. p. 29, pl. xliv. figs. 1, 3.

1826. *Carinaria mediterranea*, Risso, Hist. nat. Europ., vol. iv. p. 27.
1826. *Argonauta vitreus*, Poli. Test. utrius. Sicil., vol. iii. p. 26, pl. xliv. fig. 2.
1826. *Carinaria fragilis*, Crouch, Introduct. Lamarck's Conch., p. 43, pl. xx. fig. 19 (Shell, copy of Ency. Méth.).
1827. „ „ Bory de Saint Vincent, Ency. Méth., pl. cccclxiv. fig. 3 (copy of Péron and Lesueur).
1828. *Pterotrachea lophira*, Chiaje, Mem. Stor. Anim. senza Vert., vol. iii. p. 161, pl. xli. fig. 1.
1829. *Carinaire vitrée*, Costa, Ann. d. Sci. Nat., vol. xvi. p. 107, pl. i.
1829. *Pterotrachea lophyra*, Poli, Férussac's Bull. Sci. Nat., vol. xviii. p. 293.
1829. *Carinaire mediterranée*, Quoy and Gaimard, Ann. d. Sci. Nat., vol. xvi. p. 134, pl. ii. figs. 1–12.
1829–44. *Carinaria cymbium*, Guérin, Icon. Règne Anim., pl. xi. fig. 1.
1830. „ *mediterranea*, Deshayes, Ency. Méth., vol. ii. p. 206.
1830. „ *cymbium*, Cuvier, Règne Anim., ed. 2, vol. iii. p. 68.
1833. „ *vitrea*, Oken's Isis, p. 185, pl. vi. figs. 1–12 (copy of Quoy and Gaimard).
1836. „ *mediterranea*, Philippi, Enum. Moll. Sicil., vol. i. p. 242; vol. ii. p. 204.
1836–46. „ *cymbium*, Deshayes, Cuvier's Règne Anim. Moll., pl. xxxviii. fig. 1.
1838. „ „ Potiez and Michaud, Gal. Moll., vol. i. p. 47.
1839. „ *mediterranea*, Anton, Verzeich. Conch., p. 27.
1839. „ „ Brown, Conch. Text-Book, p. 57, pl. x. fig. 1.
1839. „ „ Sowerby, Conch. Man., fig. 488.
1839. „ „ Bosset, Mém. Soc. Sci. Nat. Neuchatel, vol. ii. p. 2, pl. i. fig. 1.
1841. "*Pterophora concacea*, Cavolini," Chiaje, Descriz. e Notomia Anim. Invert. Sicilia, vol. ii. p. 104, pl. clxxiii. figs. 1–5.
1841. *Carinaria mediterranea*, Chiaje, *op. cit.*, p. 94, pl. li. figs. 1, 2; pl. lxii. figs. 1–11.
1841. „ „ Cantraine, Mal. Médit., p. 42.
1842. „ „ Reeve, Ann. and Mag. Nat. Hist., vol. ix. pl. ii. figs. 1, 2.
1842. „ „ Reeve, Conch. Syst., vol. ii. pl. clviii. figs. 1, 2.
1843. „ „ Chiaje, Rendicont. Accad. Sci. Soc. Borbon. Napoli, vol. ii. p. 107.
1843. „ „ Forbes, Report Brit. Assoc., p. 132.
1844. „ „ Chiaje, Rendicont. Accad. Sci. Soc. Borbon. Napoli, vol. iii. p. 45 and plate.
1845. „ *fragilis*, Macgillivray, Conch. Text-Book, p. 66, pl. x. fig. 1.
1846. „ „ Reeve, Init. Conch., pl. *k.* (Animal).
1847. *Carinaire gondole*, Chenu, Leçons élém. Hist. Nat., p. 131, fig. 418 (reduced copy from Deshayes' Traité).
1847. *Carinaria vitrea*, Lovén, Öfversigt k. Vetensk.-Akad. Förhandl., p. 191, pl. iv. (Dentition).
1848. „ *mediterranea*, Requien, Moll. de Corse, p. 88.
1850. „ „ Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. clxi. fig. 1 (copy of Deshayes).
1850. „ „ Gray, *loc. cit.*, pl. lxiii. fig. *i* (copy of Blainville).
1850. „ „ Gray, *loc. cit.*, pl. clix. fig. 3 (copy from Cuvier's Mem. Moll.).
1850. „ „ Gray, *loc. cit.*, pl. clxi. fig. 2 (copy of Chiaje).
1850? „ „ Deshayes, Traité élém. Conch., pl. ci. fig. 5.
1851. „ „ Leydig, Zeitschr. f. wiss. Zool., Bd. iii. p. 325, pl. ix. (Anatomy).
1853. „ „ Vérany, Journ. de Conchyl., vol. iv. p. 381.
1854. „ *cymbium*, Woodward, Man. Moll., p. 200, fig. 105 (copy of Blainville), and pl. xiv. fig. 19.
1855. „ *mediterranea*, Gegenbaur, Untersuch. Pterop. und Heterop., p. 214.

1855. *Carinaria mediterranea*, Küster, Conch. Cab. Heteropoda, pl. i. fig. 1 (enlarged copy of Blainville).
1856. „ „ Troschel, Gebiss d. Schneck., vol. i. p. 43, pl. ii. figs. 6–9.
1856. „ „ Jeffreys, Ann. and Mag. Nat. Hist., vol. xvii. p. 180.
1858. „ „ Owen, Ency. Brit., vol. xv. p. 377, fig. 70 (copy of Eydoux and Souleyet, reduced).
1859. „ *cymbium*, Chenu, Man. Conch., vol. i. p. 125, figs. 544, 545.
1860. „ *fragilis*, Reeve, Init. Conch., ed. 2, vol. ii. p. 43, pl. *k.* (Animal).
1860. „ *mediterranea*, Krohn, Beiträge Entwick. Pterop. und Heterop., p. 36, pl. ii.
1865. „ *fragilis*, Reeve, Conch. Icon., vol. xv. pl. i. figs. 1*a–b*.
1866. „ *cristata*, Sowerby, Thes. Conch., vol. iii. p. 303, pl. cclxxix. figs. 2, 3.
1866. „ *cymbium*, Keferstein, in Bronn's Thierreich, vol. iii. pt. 2, p. 809, fig. 56; pl. lxviii. figs. 9–11; pl. lxix. figs. 5–7.
1868. „ *mediterranea*, Weinkauff, Conch. Mittelm., vol. ii. p. 431.
1876. „ „ Fol, Arch. d. Zool. Expér., vol. v. p. 107, pl. iv. figs. 1–2 (Development).
1878. „ „ Kobelt, Illust. Conch., pl. i. fig. 15.
1880. „ „ Krukenberg, Vergleich. Physiol. Studien, p. 177 (Movement of the Foot).
1883. „ „ Fischer, Man. Conch. p. 577, fig. 342 (reduced copy of Eydoux and Souleyet).
1883. „ „ (*partim*), Lankester, Ency. Brit., vol. xvi. p. 654, fig. 50A (from Owen).
1883. „ „ Martens, Weich- und Schaltiere, p. 157 (woodcut).
1883. „ *fragilis*, Tryon, Struct. Syst. Conch., vol. ii. pl. lxxxviii. fig. 99 (copy of Blainville).

Habitat.—Mediterranean.

This, the commonest of the *Carinariæ*, has been generally known as *Carinaria mediterranea*. It has also been called *Carinaria vitrea*, *Carinaria fragilis*, *Carinaria cymbium*, and by two or three other appellations. Who was the first to impose upon it the name of *Carinaria mediterranea* is somewhat uncertain, but as far as I can judge the credit rests either with Sowerby or de Blainville. The name *Carinaria vitrea* certainly was not applied to this species by Gmelin, but to the rarer eastern form which I call *Carinaria cristata*. The term *Carinaria fragilis* was assigned by authors to this species under the supposition that the *Carinaria fragilis* of Bory de Saint Vincent and the Mediterranean species were the same. I have in connection with that species made some observations which tend to show that these forms are different. Should, however, it be possible to prove them to be identical, the name *fragilis* should be used, as it has priority over any other which has been given to this species.

Argonauta cymbium of Linné was considered a *Carinaria* by Lamarck and Cuvier, and others mistook it for this species.

The shell described by Linné[1] under this name has been considered by von Martens[2]

[1] Syst. Nat., ed. 12, p. 1161.

[2] *Ann. and Mag. Nat. Hist.*, 1867, vol. xx. p. 103.

(and probably correctly I think) "a foraminiferous shell (*Peneroplis planatus*, Montfort)." Whether it be this or not it is certain that it has nothing to do with the present species of *Carinaria*.

In 1880 Péron and Lesueur figured this species in the Annales du Museum, and imposed upon it the name of "Carinaire Lamarck," which seven years later was rendered into Latin (*Carinaria lamarkii*) by de Blainville.

This name, which has been overlooked by all subsequent writers, has some years' priority over that of *Carinaria mediterranea*, and should therefore be employed. It is remarkable that Deshayes should not have been acquainted with this fact, and that de Blainville subsequently designated this species with the name *Carinaria mediterranea*.

In the Dictionaire classique d'histoire naturelle Bory de Saint Vincent pointed out that the shell figured in the Encyclopédie Méthodique as *Carinaria fragilis* is different from that species, and imposed upon it the name of *Carinaria lamarckii*. This is now always regarded the same as the well-known Mediterranean species, and it is a curious coincidence that Bory de Saint Vincent should have given to it the same name as that proposed by Péron and Lesueur.

Carinaria depressa, Rang.

1827. *Carinaria depressa*, Rang, Bull. Sci. Nat., vol. xii. p. 343.
1829. „ „ Rang, Ann. d. Sci. Nat. p. 140.
1830. „ „ Rang, Férussac's Bull. Sci. Nat., vol. xxi. p. 331.
1830. „ „ Cuvier, Règne Anim., ed. 2, vol. iii. p. 68.
1833. „ „ Oken, Isis, p. 186.
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 96.

Habitat.—Near Madagascar (Rang).

Carinaria australis, Quoy and Gaimard.

1832. *Carinaria australis*, Quoy and Gaimard, Voy. "Astrolabe," Zool., vol. ii. p. 394, pl. xxix. figs. 9–16.
1843. „ „ Gray, Dieffenbach's New Zeal., p. 244.
1844. „ „ *id.*, Rev. Zool., p. 358 (from Dieffenbach).
1850. „ „ Gray, Fig. Moll. Anim., pl. lxiii. fig. 2 (copy of Quoy's figure).
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 96.
1880. „ „ Hutton, Man. New Zeal. Moll., p. 119.

Habitat.—South Pacific, between Australia and New Zealand (Quoy and Gaimard).

Carinaria galea, Benson.

1835. *Carinaria galea*, Benson, Journ. Asiat. Soc. Bengal, vol. iv. p. 216.

Habitat.—Indian Ocean (Benson).

Carinaria cithara, Benson.

1835. *Carinaria cithara*, Benson, Journ. Asiat. Soc. Bengal, 1835, vol. iv. p. 215.

Habitat.—Indian Ocean (Benson).

Carinaria punctata, d'Orbigny.

1836. *Carinaria punctata*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 160, pl. xi. figs. 6–15.
1845. „ „ Catlow, Conchol. Nomencl., p. 116.
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 96.

Habitat.—South Pacific, near the island of Juan Fernandez (d'Orbigny).

Carinaria gaudichaudii, Eydoux and Souleyet.

1841. *Carinaire de Gaudichaud*, Eydoux and Souleyet, Voy. "Bonite," Atlas, pl. xvii. figs. 19–22.
1850. *Carinaria gaudichaudii*, Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. ccxxxix. fig. 4 (copy of Eydoux and Souleyet).
1852. „ „ Souleyet, Voy. "Bonite," Zool., vol. ii. p. 359.
1855. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 96.
1858. „ „ Owen, Ency. Brit., vol. xv. p. 377, fig. 70 (Shell, copy of Eydoux and Souleyet).
1862. „ „ Macdonald, Trans. Roy. Soc. Edin., vol. xxiii., pl. ii. figs. 4, 4′, 5*d*.
1883. „ *mediterranea* (*partim*), Lankester, Ency. Brit., vol. xvi. p. 654, fig. 50B (same as Owen).

Habitat.—China Seas (Eydoux and Souleyet).
Atlantic and Pacific Oceans (Macdonald).

Carinaria atlantica, Adams and Reeve.

1848. *Carinaria atlantica*, Adams and Reeve, Voy. "Samarang," Moll., p. 63, pl. xiii. fig. 12.
1850. „ sp. n., Gray, Fig. Moll. Anim., vol. iv. p. 100, pl. ccxxxix. fig. 2.
1855. „ *atlantica*, H. and A. Adams, Gen. Moll., vol. ii. p. 96, pl. lxx. fig. 1.
1865. „ „ Reeve, Conch. Icon., vol. xv. pl. i. fig. 3.
1866. „ „ Sowerby, Thesaur. Conch., vol. iii. p. 303, pl. cclxxix. fig. 1.

Habitat.—North Atlantic Ocean (A. Adams).

Carinaria cornucopia, Gould.

1861. *Carinaria cornucopia*, Gould, Proc. Boston Soc. Nat. Hist., vol. vii. p. 408.
1861. „ „ *id.*, Otia, Conch., p. 152.

Habitat.—South of the Caroline Islands (Gould).

Carinaria sp.

Habitat.—Atlantic; June 28, 1873; lat. 35° 47′ N., long. 8° 23′ W.

Of this species there are two specimens in the Challenger collection, both deprived of their shells. I have been unable to identify them satisfactorily with any of the described forms, but it seems distinct from the common Mediterranean species. It is peculiar in having the entire surface minutely dotted with white, besides numerous tubercles which are also very generally distributed. It is possible it may be the same as *Carinaria*

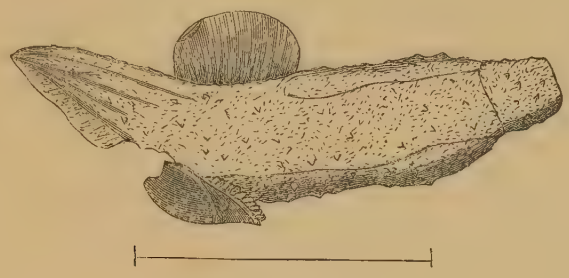

Fig. 5.—*Carinaria* sp.

punctata of d'Orbigny, but it does not quite answer his description as regards colour, and the form of the fin and the tail do not correspond with his figure.

I have not ventured to give a name to this species, as I think it would be more advisable to wait until living specimens and the shell can be examined, for, as is the case with all Mollusks when placed in spirit, the colours change or vanish, and through shrinkage a very poor notion of the living form is to be obtained.

Family II. Atlantidæ.

1825. *Procephala* (*partim*), Latreille, Fam. Règne Anim., p. 169.
1829. *Atlantides*, Rang, Man. Moll., p. 123.
1832. *Atlantidæ*, Wiegmann and Ruthe, Handbuch d. Zool., p. 518.
1836. *Atlantideæ*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 162.
1838. *Atlantides*, Potiez and Michaud, Gal. Moll., vol. i. p. 48.
1839. *Atlantideæ*, d'Orbigny, Hist. Nat. Canaries, Moll., p. 35.
1840. *Atlantidæ*, Gray, Synopsis Brit. Mus., p. 147.
1841. „ *id.*, *op. cit.*, p. 125.
1841. *Atlantides*, Cantraine, Mal. Médit., p. 36.
1841. *Atlantidæ*, d'Orbigny, Hist. Nat. Cuba Moll., vol. i. p. 98.
1842. „ d'Orbigny, Paléont. franç., Terr. crét., vol. ii. p. 19.
1850. „ Gray, Fig. Moll. Anim., vol. iv. p. 101.
1853. *Atlantacea*, Philippi, Handbuch Conch., pp. 282, 284.
1854. *Atlantidæ*, H. and A. Adams, Gen. Moll., vol. ii. p. 90.
1854. „ Woodward, Man. Moll., p. 200.

1855. *Atlantida*, Gegenbaur, Untersuch. Pterop. und Heterop., p. 214.
1856. *Atlantacea*, Troschel, Gebiss d. Schneck., vol. i. p. 41.
1856. *Atlanten*, Krohn, Müller's Archiv f. Anat. Physiol., p. 519 (Development).
1857. *Atlantidæ*, Gray, System. Arrang. Moll., p. 133.
1859. „ Chenu, Man. Conch., vol. i. p. 121.
1866. *Atlantacea*, Keferstein, Bronn's Thierreich, vol. iii. pt. 2, p. 850.
1868. *Atlantidæ*, Weinkauff, Conch. Mittelm., vol. ii. p. 430.
1883. „ Tryon, Struct. and Syst. Conch., vol. ii. p. 350.
1883. „ Fischer, Man. Conch., p. 581.
1883. *Atlantacea*, Lankester, Ency. Brit., vol. xvi. p. 653 (as a suborder).
1884. *Atlantidæ*, Grasset, Index Test. Viv., p. 146.

Genus *Atlanta*, Lesueur.

1797. *Corne d'Ammon*, Lamanon, Voy. de La Perouse, vol. iv. pp. 134–139, pl. lxiii. figs. 1–4 at bottom.
1817. *Atlanta*, Lesueur, Journ. de Physique, vol. lxxxv. p. 390, pl. ii.
1819. *Atlantis*, Oken's Isis, p. 41.
1822. *Atlanta*, Férussac, Tab. Syst., p. xxv.
1824. „ Blainville, Dict. d. Sci. Nat., vol. xxxii. p. 284.
1825. „ Latreille, Fam. Nat. Règne Anim., p. 169.
1825. *Steira*, Eschscholtz, Isis von Oken, p. 735.
1825. *Atlanta*, Blainville, Man. Malacol., p. 493.
1827. „ Rang, Mém. Soc. Hist. Nat. Paris, vol. iii. p. 372, pl. ix.
1829. „ Rang, Man. Moll., p. 123.
1830. „ Cuvier, Règne Anim., ed. 2, vol. iii. p. 68.
1830. „ Deshayes, Ency. Méth., vol. ii. p. 80.
1830. *Steirå*, Menke, Synopsis Moll., ed. 2, p. 9.
1832. *Atlanta*, Wiegmann and Ruthe, Handbuch d. Zool., p. 518.
1834. „ Gray, Griffith's Cuvier Anim. King., vol. xii. p. 51.
1835. „ Oken, Naturgesch., vol. v. p. 515.
1835. *Steira*, Oken, Naturgesch., vol. v. p. 515.
1836. *Atlanta*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 162.
1838. „ Potiez and Michaud, Gal. Moll., vol. i. p. 48.
1839. „ Sowerby, Conch. Man., p. 10.
1839. „ d'Orbigny, in Webb and Berthelot's Hist. Nat. Canaries, Moll., pp. 35, 36.
1841. „ Cantraine, Mal. Médit., p. 39.
1841. „ d'Orbigny, in Sagra's Hist. Cuba, Moll., vol. i. p. 101.
1842. „ *id.*, Paléont. franç., Terr. crét., vol. ii. p. 19.
1843. „ Gravenhorst, Vergleich. Zool., p. 65.
1843. „ Forbes, Report Brit. Assoc., 1843, p. 132.
1844. „ Philippi, Enum. Moll. Sicil., vol. ii. p. 205.
1847. „ Lovén, Öfversigt k. Vetensk.-Akad. Förhandl., p. 191 (Dentition).
1850. „ Gray, Fig. Moll. Anim., vol. iv. p. 101.
1850. „ Huxley, Ann. d. Sci. Nat., vol. xiv. p. 193 (Circulation).
1852. „ Souleyet, Voy. "Bonite," Zool., vol. ii. p. 361.
1852. „ Costa, Fauna Reg. Napoli Moll., Eteropodi, p. 1.
1853. „ Philippi, Handbuch Conch., p. 284.
1854. „ Woodward, Man. Moll., p. 200.

1854. *Atlanta*, H. and A. Adams, Gen. Moll., vol. ii. p. 91.
1855. „ Gegenbaur, Untersuch. Pterop. und Heterop., pp. 105–130, 214.
1856. „ Troschel, Gebiss d. Schneck., vol. i. p. 42.
1857. „ Gray, Syst. Arrang. Moll. Brit. Mus., p. 134.
1859. „ Chenu, Man. Conch., vol. i. pp. 121, 122.
1860. „ Krohn, Beiträge Entwick. Pterop. und Heterop., p. 33.
1862. „ Macdonald, Trans. Roy. Soc. Edin., vol. xxiii. pl. ii. figs. 1, 1′, 5*g*.
1866. „ Keferstein, Bronn's Thierreich, vol. iii. pt. 2, p. 850, pl. lxviii. figs. 1, 2, 3, 4.
1868. *Atalanta*, Knocker, Proc. Zool. Soc. Lond., p. 616.
1873. *Atlanta*, Weinkauff, Cat. Europ. Meer. Conch., p. 44.
1883. „ Tryon, Syst. Struct. Conch., vol. ii. p. 350.
1883. „ Fischer, Man. Conch., p. 581.

There is a very great similarity in the general construction and form of the species of this genus, but on careful comparison certain features are recognisable which will distinguish them. They are to be separated chiefly on account of differences in the shells, as few observers have had the opportunity of seeing living specimens in their native element. The number, form, size, and position of the apical whorls constitute good distinguishing characters, but very careful observation and study are requisite. In determining the Challenger specimens I have had the very great advantage of comparing them with Eydoux and Souleyet's collection in the British Museum.

Atlanta peronii, Lesueur.

1817. *Atlanta peronii*, Lesueur, Journ. de Physique, vol. lxxxv. p. 390, pl. ii. figs. 1, 2.
1824. „ „ Blainville, Dict. d. Sci. Nat., vol. xxxii. p. 284, pl. lxviii. figs. 9, 9*a* (copy of Lesueur, reversed).
1825. „ „ *id.*, Man. Malacol., pl. xlviii. *bis*, figs. 9, 9*a* (same fig.).
1827. „ „ Rang, Mém. Soc. Hist. Nat. Paris, vol. iii. p. 380, pl. ix. figs. 1, 2, 3, 7.
1830. „ „ Deshayes, Ency. Méth., vol. ii. p. 83.
1830. „ „ Cuvier, Régne Anim., ed. 2. vol. iii. p. 68.
1832. „ *keraudrenii* (*non* Lesueur), Quoy and Gaimard, Voy. "Astrolabe," Zool., vol. ii. p. 399, pl. xxix. figs. 18–23.
1836. „ *peronii*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 171, pl. xii. figs. 1–15.
1836–46. „ „ Deshayes, Cuvier's Règne Anim., Moll., pl. xxxviii. fig. 2 (copy of Rang).
1838. „ „ Potiez and Michaud, Gal. Moll., vol. i. p. 48.
1839. „ „ d'Orbigny, Hist. Nat. Canaries, Moll., p. 36.
1840. „ *costæ*, Pirajno, Efem. Sci. Sicil., vol. xxviii. p. 149, figs. 1*a*, CD.
1841. *Atlante de Péron*, Eydoux and Souleyet, Voy. "Bonite," Atlas Zool., pl. xix. figs. 1–8.
1841. *Atlanta peronii*, Cantraine, Mal. Médit. p. 39, pl. i. fig. 1.
1841. „ „ d'Orbigny, Sagra's Hist. Cuba, Moll., vol. i. p. 102.
1843. „ „ Forbes, Report Brit. Assoc., p. 132.
1844. „ „ Philippi, Enum. Moll. Sicil., vol. ii. p. 205.
1850. „ „ Gray, Fig. Moll. Anim., pl. cxvii.*b*, fig. 5 (copy of Rang).
1850. „ „ *id.*, *op. cit.*, pl. cxvii.*b*, fig. 4 (copy of Quoy and Gaimard).
1850. „ „ *id.*, *op. cit.*, pl. ccxl. fig. 6 (copy of Eydoux and Souleyet).
1850. „ „ *id.*, *op. cit.*, pl. cxvii.*b*, figs. 2–2*b* (copy of d'Orbigny).

1850. *Atlanta peronii*, Gray, *op. cit.*, pl. cxvii.*c*, fig. 1 (copy of Blainville).
1852. „ „ Souleyet, Voy. "Bonite," Zool., vol. ii. p. 373.
1852. „ „ Costa, Fauna Reg. Napoli, Eteropodi, p. 3, pl. i. fig. 2 (copy of Pirajno).
1853. „ „ Vérany, Journ. de Conchyl., vol. iv. p. 382.
1854. „ „ Woodward, Man. Moll., pl. xiv. figs. 21–23.
1854. „ „ H. and A. Adams, Gen. Moll., vol. ii. p. 91; vol. iii. pl. lxix. figs. 5–5*b*.
1855. „ „ Gegenbaur, Untersuch. Pterop. und Heterop., p. 214, pl. vi.
1856. „ „ Troschel, Gebiss d. Schneck., vol. i. p. 42, pl. ii. fig. 4.
1858. „ „ Owen, Ency. Brit., vol. xv. p. 375, fig. 66; p. 376, fig. 67.
1866. „ „ Keferstein, Bronn's Thierreich, vol. iii. pt. 2, pl. lxviii. figs. 1–4; pl. lxix. fig. 2.
1868. „ „ Weinkauff, Conch. Mittelm., vol. ii. p. 430.
1878. „ „ Sowerby, Conch. Icon., Pteropoda, pl. iii. fig. 20*a–b*.
1883. „ „ Fischer, Man. Moll., pl. xiv. figs. 21–23 (same as Woodward).
1884. „ „ Sowerby, Thes. Conch., vol. v. p. 148, pl. cccclxxiv. figs. 63, 64.

Habitat.—Atlantic, Pacific, and Indian Oceans.

Atlanta turriculata, d'Orbigny.

1836. *Atlanta turriculata*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 173, pl. xx. figs. 5–11.
1852. „ „ Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 391; Atlas (1841), pl. xxi. figs. 30–35.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxlii. fig. 6 (copy of Eydoux and Souleyet).
1859. „ „ Chenu, Man. Conch., vol. i. p. 122, figs. 533, 534.
1883. „ „ Tryon, Struct. Syst. Conch., vol. ii. pl. lxxxvi. figs. 4, 5 (copy of Eydoux and Souleyet, reduced).

Habitat.—South Pacific (d'Orbigny); Pacific and Indian Oceans (Eydoux and Souleyet).

Atlanta lesueurii, Eydoux and Souleyet.

1852. *Atlanta lesueurii*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 380; Atlas (1841), pl. xx. figs. 1–8.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxli. fig. 5 (copy of Eydoux and Souleyet).
1853. „ *lesuerii*, Huxley, Phil. Trans., vol. cxliii. pp. 36–39, pl. iii. figs. 1–6 (Anatomy).

Habitat.—Atlantic Ocean.

The figure of the dentition given by Lovén[1] as that of *Atlanta lesueurii* apparently is that of *Oxygyrus keraudrenii*.

[1] *Öfversigt k. Vetensk.-Akad. Förhandl.*, 1847, pl. iv.

Atlanta involuta, Eydoux and Souleyet.

1852. *Atlanta involuta*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 388; Atlas (1841), pl. xxi. figs. 9–14.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxlii. fig. 3 (copy of Eydoux and Souleyet).

Habitat.—Pacific Ocean (Eydoux and Souleyet).

Atlanta inflata, Eydoux and Souleyet.

1852. *Atlanta inflata*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 378; Atlas (1841), pl. xix. figs. 8–21.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxli. fig. 3 (copy of Eydoux and Souleyet).

Habitat.—China Sea.

The shell figured by Sowerby[1] under the name of *Atlanta inflata* appears to be *Spirialis rostralis* of Eydoux and Souleyet.

Atlanta inclinata, Eydoux and Souleyet.

1852. *Atlanta inclinata*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 375; Atlas (1841), pl. xix. figs. 9–15.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxli. fig. 1 (copy of Eydoux and Souleyet).

Habitat.—Pacific and Atlantic Oceans (Eydoux and Souleyet).

Atlanta helicinoides, Eydoux and Souleyet.

1852. *Atlanta helicinoides*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 384; Atlas (1841), pl. xx. figs. 23–30.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxlii. fig. 2 (copy of Eydoux and Souleyet).

Habitat.—Pacific Ocean (Eydoux and Souleyet).

Atlanta gibbosa, Eydoux and Souleyet.

1852. *Atlanta gibbosa*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 386; Atlas (1841), pl. xxi. figs. 1–8.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxl. fig. 5 (copy of Eydoux and Souleyet).
1850. „ *spirata*, Souleyet, Deshayes Traité Conch., pl. ci. figs. 6–8 (copy of Eydoux and Souleyet, figs. 2–4).
1858. „ *gibbosa*, Owen, Ency. Brit., vol. xv. p. 376, fig. 69 (copy of Eydoux and Souleyet).
1859. „ *gibba*, Chenu, Man. Conch., vol. i. figs. 531–2 (copy of Eydoux and Souleyet).

Habitat.—Atlantic Ocean (Eydoux and Souleyet).

[1] Conch. Icon., Pteropoda, pl. vi. fig. 42, and Thes. Conch., vol v. pl. cccclxxiv. fig. 65.

Atlanta gaudichaudii, Eydoux and Souleyet.

1852. *Atlanta gaudichaudii*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 397; Atlas (1841), pl. xix. figs. 29–34.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxli. fig. 4 (copy of Eydoux and Souleyet).
1859. „ „ Chenu, Man. Conch., vol. i. p. 121, fig. 525 (also apparently after Eydoux and Souleyet).

Habitat.—Pacific Ocean (Gaudichaud *fide* Eydoux and Souleyet).

Atlanta fusca, Eydoux and Souleyet.

1852. *Atlanta fusca*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 389; Atlas (1841), pl. xxi. figs. 15–29.
1850. „ *brunnea*, Gray, Fig. Moll. Anim., vol. iv. p. 101, pl. ccxlii. fig. 5 (copy of Eydoux and Souleyet).

Habitat.—All seas (Eydoux and Souleyet).

Gray named this species *Atlanta brunnea* through a false rendering into Latin of "Atlante brune" of the French authors. An excellent distinctive feature of this species, overlooked by the authors, are the fine spiral raised lines which are visible on both sides of the spire but not upon the last whorl. This character will assist in distinguishing it from *Atlanta turriculata*, d'Orbigny, an allied form.

Atlanta depressa, Eydoux and Souleyet.

1852. *Atlanta depressa*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 385; Atlas (1841), pl. xx. figs. 31–37.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxlii. fig. 4 (copy of Eydoux and Souleyet).

Habitat.—Pacific Ocean (Eydoux and Souleyet).

Atlanta rosea, Eydoux and Souleyet.

1852. *Atlanta rosea*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 377; Atlas (1841), pl. xix. figs. 16–20.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxli. fig. 2 (copy of Eydoux and Souleyet).

Habitat.—Atlantic Ocean (Eydoux and Souleyet).

Atlanta quoyana, Eydoux and Souleyet.

1852. *Atlanta quoyana*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 383; Atlas, (1841), pl. xx. figs. 16–22.
1850. „ *quoyii*, Gray, Fig. Moll. Anim., vol. iv. p. 101, pl. ccxlii. fig. 1 (copy of Eydoux and Souleyet).

Habitat.—Pacific Ocean (Eydoux and Souleyet).

Atlanta mediterranea, Costa.

1852. *Atlanta mediterranea*, Costa, Fauna Reg. Napoli, Eteropodi, p. 4, pl. i. figs. 1*a*, A.B.C.

Habitat.—Bay of Naples.

This appears to be a large species, supposing that Costa's figure (1*a*) represents the natural size. The shell is peculiar on account of the keel extending to the aperture as in *Oxygyrus keraudrenii*, and not embracing the whorls of the spire as is the case in *Atlanta peronii*.

Atlanta violacea, Gould.

1852. *Atlanta violacea*, Gould, U.S. Explor. Exped., vol. xii. p. 493; Atlas, figs. 599–599*b*.
1862. „ „ *id.*, Otia, Conch., p. 236.

Habitat.—Mid Atlantic (Gould).

Atlanta tessellata, Gould.

1852. *Atlanta tessellata*, Gould, U.S. Explor. Exped., vol. xii. p. 494; Atlas, figs. 600–600*b*.
1862. „ „ *id.*, Otia, Conch., p. 236.

Habitat.—Mid Atlantic (Gould).

Atlanta primitia, Gould.

1852. *Atlanta primitia*, Gould, U.S. Explor. Exped., vol. xii. p. 491; Atlas, fig. 597.
1862. „ „ *id.*, Otia, Conch., p. 235.

Habitat.—Equatorial Atlantic (Gould).

Atlanta cunicula, Gould.

1852. *Atlanta cunicula*, Gould, U.S. Explor. Exped., vol. xii. p. 492; Atlas, figs. 598–598*c*.
1852. „ „ *id.*, Otia, Conch., p. 236.

Habitat.—Pacific Ocean, west of the Sandwich Islands (Gould).

Atlanta souleyeti, Smith.

1852. *Atlanta lamanonii*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 371; Atlas (1841), pl. xviii. figs. 30–37.
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxl. fig. 3 (copy of Eydoux and Souleyet).

Habitat.—Atlantic Ocean.

Eschscholtz employed the specific name *lamanonii* in 1825, and although I am inclined to consider that species beyond recognition, still I think that to prevent confusion another name should be given to the present species. I therefore propose to designate it *Atlanta souleyeti*.

In 1852 Costa named a fossil species *Atlanta lamanoni*. This should also receive a fresh name.

The membranous keel which is one of the distinguishing features of this species is not present in any of the dead shells dredged by the Challenger, and probably decays rapidly after death. The absence of the carina imparts a peculiar roundness to the last whorl, producing a very unusual appearance for a species of *Atlanta*.

This species has been considered by Macdonald to belong to the genus *Oxygyrus*. Although the keel upon the last whorl is described as cartilaginous as in *Oxygyrus rangii* and *Oxygyrus keraudrenii*, the shell itself is of the same vitreous character and the operculum the same as that of *Atlanta*. I think therefore this species must belong to that genus, and especially as Souleyet associates it with the recognised species of that group.

Undefined Species.

1. *Steira lamanoni*.

1825. *Steira lamanoni*, Eschscholtz, Oken's Isis, p. 735, pl. v. fig. 3.
1850. „ „ Gray, Fig. Moll. Anim., vol. iv. p. 101.

Habitat.—South Sea (Eschscholtz).

The figure given by Eschscholtz is apparently not at all reliable, and although beyond doubt representing an *Atlanta*, the particular species intended cannot be determined with certainty.

2. *Atlanta helicialis*.

1839. *Atlanta helicialis*, Sowerby, Conch. Man., fig. 220.

The shell figured by Sowerby under the above name appears to resemble *Atlanta lesueurii*, Eydoux and Souleyet, more closely than any other. The drawing, however, is of so coarse a character that the certain identification of it is quite impossible.

3. and 4. *Atlanta* sp. (?).

Two species are roughly figured by Gray[1] from drawings by Dr. Hooker. This being all that is known respecting them, they are quite beyond certain recognition. The species represented by figure 7 may be *Oxygyrus keraudrenii*.

[1] Fig. Moll. Anim., pl. cxvii.c. figs. 2, 7.

5. *Ladas planorboides*, Forbes.

1843. *Ladas planorboides*, Forbes, Report Brit. Assoc., p. 186.

Habitat.—Ægean Sea.

"L. testa pellucida, alba, lævi, compressa, carinata, exalata, aufractibus 4. Diam. $0\frac{1}{12}$."

This is all the information respecting this species which is given by Forbes. It is impossible to identify it from this description, and therefore it seems advisable to reject it entirely.

6. *Helicophlegma candei*, d'Orbigny.

1841. *Helicophlegma candei*, d'Orbigny, Sagra's Hist. Cuba, Moll., vol. i. p. 100, pl. xi. figs. 15, 17.
1859. „ „ Chenu, Man. Conch., vol. i. p. 122, figs. 529, 530 (reduced copy of d'Orbigny).

Habitat.—Antilles (d'Orbigny).

This form is probably the embryonic stage of a Gastropod such as *Lamellaria*, &c. D'Orbigny (*loc. cit.*), conjecturing its distinctness from *Helicophlegma* (= *Oxygyrus*), proposed the genus *Brownia* for its reception.

Genus *Oxygyrus*, Benson.

1835. *Oxygyrus*, Benson, Journ. Asiat. Soc. Bengal., vol. iv. p. 174.
1836. *Helicophlegma*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 168 (as subgen.).
1837. *Oxygyrus*, Benson, *op. cit.*, vol. vi. p. 316.
1839. *Helicophlegma*, d'Orbigny, Hist. Nat. Canaries, Moll., p. 35.
1841. „ *id.*, Sagra's Hist. Cuba, Moll., vol. i. p. 98.
1841. *Ladas*, Cantraine, Mém. Acad. Sci. Bruxelles, vol. xiii. p. 37.
1842. *Helicophlegma*, d'Orbigny, Paléont. franç., Terr. crét., vol. ii. p. 19.
1843. *Ladas*, Forbes, Report Brit. Assoc., pp. 132, 186.
1844. „ Philippi, Enum. Moll. Sicil., vol. ii. p. 205.
1850. *Oxygyrus*, Gray, Fig. Moll. Anim., vol. iv. p. 101.
1853. „ Philippi, Handbuch, p. 285.
1854. „ H. and A. Adams, Gen. Moll., vol. ii. p. 92.
1854. „ Woodward, Man. Moll. p. 201.
1856. „ Troschel, Gebiss d. Schneck., vol. i. p. 41.
1857. *Oxygyrus*, Gray, Syst. Arrang. Moll., p. 133.
1859. *Helicophlegma*, Chenu, Man. Conch., vol. i. p. 122.
1862. *Oxygyrus*, Macdonald, Trans. Roy. Soc. Edin., vol. xxiii. pl. ii. figs. 2, 2′, 3, 5*e*, 5*f*.
1866. „ Keferstein, Bronn's Thierreich, vol. iii. pt. 2, p. 850.
1868. *Ladas*, Weinkauff, Conch. Mittel., vol. ii. p. 430.
1873. „ *id.*, Cat. Europ. Meer. Conch., p. 44.
1883. *Oxygyrus*, Tryon, Struct. Syst. Conch., vol. ii. p. 351.
1883. „ Fischer, Man. Conch., p. 582.

Macdonald places in this genus *Atlanta rangii*, *Atlanta keraudrenii*, and *Atlanta lamanonii*, which he states are "characterised by having an involute instead of a spiral nucleus to the shell, greater fullness in the whorls, and a comparatively small amount of calcareous matter as a component, particularly near the mouth and in the keel."

These observations are applicable to the two first-named species but not to the last. This, which I have previously referred to as *Atlanta souleyeti*, resembles the other species of *Oxygyrus* in having a membranous and not a hardened glossy keel to the shell as in the rest of the species of *Atlanta*, but it has not an involute spire, and the operculum according to Eydoux and Souleyet's figure is quite of the normal type of *Atlanta* and not like that of *Oxygyrus*. I think, therefore, it should be retained in the former genus.

Oxygyrus keraudrenii (Lesueur).

1817. *Atlanta keraudrenii*, Lesueur, Journ. de Physique, vol. lxxxv. p. 391, pl. ii.
1827. „ „ Rang, Mém. Soc. Hist. Nat. Paris, vol. iii. p. 380, pl. ix. figs. 4, 5, 6, 8.
1830. „ „ Deshayes, Ency. Méth., vol. ii. p. 83.
1830. „ „ Cuvier, Règne Anim., ed. 2, vol. iii. p. 69.
1832. „ „ Rang, Mag. de Zool., classe v. pl. iv. figs. 1–7.
1832–44. „ „ Guérin, Icon. Règne Anim., pl. xi. fig. 2 (copy of Rang, 1832).
1836. „ „ Deshayes, Cuvier's Règne Anim. Moll., pl. xxxviii. fig. 3 (copy of Rang, Mem. Soc. Hist. Nat.).
1836. „ (*Helicophlegma*) *keraudrenii*, d'Orbigny, Voy. Amér. mérid., vol. v. p. 169, pl. xi. figs. 16–23, pl. xx. figs. 3, 4.
1839. „ „ „ *id.*, Hist. Nat. Canaries, Moll., p. 35.
1840. „ *bivonæ*, Pirajno Efem. Sci. Sicil., vol. xxviii. p. 148, figs. 2*a*, *b*, B.C.
1841. *Helicophlegma keraudrenii*, d'Orbigny, Sagra's Hist. Cuba, Moll., vol. i. p. 99.
1841. *Atlante de kéraudren*, Eydoux and Souleyet, Voy. "Bonite," Atlas Zool., pl. xviii. figs. 1–17.
1841. *Ladas keraudrenii*, Cantraine, Mal. Médit., p. 38, pl. i. fig. 2.
1844. „ „ Philippi, Enum. Moll. Sicil., vol. ii. p. 205.
1847. *Atlanta keraudrenii*, Chenu, Leçons Elém. Hist. Nat., p. 132, fig. 419.
1847. „ *lesueurii* (*?*), Lovén, Öfversigt k. Vetensk.-Akad. Förhandl., pl. iv.
1848. *Ladas keraudrenii*, Requien, Cat. Coq. de Corse, p. 88.
1850. *Oxygyrus keraudrenii*, Gray, Fig. Moll. Anim., pl. ccxl. figs. 2, 2*a* (copy of Lesueur).
1850. „ „ *id.*, *op. cit.*, pl. cxvii.*c*, fig. 3 (copy of Rang, 1832).
1850. „ „ *id.*, *op. cit.*, pl. cxvii.*b*, figs. 3–3*c* (copy of Rang, 1827).
1850. „ „ *id.*, *op. cit.*, pl. cxvii.*c*, fig. 6 (copy of Cantraine).
1850. „ „ *id.*, *op. cit.*, pl. ccxxxviii. fig. 3 (copy of Eydoux and Souleyet).
1850. „ „ *id.*, *op. cit.*, pl. cxvii.*b*, fig. 1 (copy of d'Orbigny).
1850? *Atlanta keraudrenii*, Deshayes, Traité de Conch., pl. ci. figs. 1–4 (copy of Eydoux and Souleyet).
1852. „ „ Souleyet, Voy. "Bonite," Zool., vol. ii. p. 364.
1852. „ „ Costa, Fauna Reg. Napoli, Eteropodi, p. 5, pl. i. fig. 3 (copy of Pirajno).
1853. „ „ Vérany, Journ. de Conchyl., vol. iv. p. 381.
1854. *Oxygyrus keraudrenii*, H. and A. Adams, Gen. Moll., vol. ii. p. 92; vol. iii. pl. lxix. figs. 6–6*b*.

1854. *Oxygyrus keraudrenii*, Woodward, Man. Moll., pl. xiv. figs. 24, 25.
1855. *Atlanta keraudrenii*, Gegenbaur, Untersuch. Pterop. und Heterop., p. 214.
1856. *Oxygyrus keraudrenii*, Troschel, Gebiss d. Schneck., vol. i. p. 41, pl. ii. fig. 2.
1858. *Atlanta keraudrenii*, Owen, Ency. Brit., vol. xv. p. 375, fig. 65; p. 376, fig. 68.
1859. „ „ Chenu, Man. Conch., vol. i. p. 121, figs. 526–528 (copy of Eydoux and Souleyet).
1866. *Oxygyrus keraudernii*, Keferstein, Bronn's Thierreich, vol. iii. pt. 2, pl. lxviii. figs. 5–8.
1868. „ „ Knocker, Proc. Zool. Soc. Lond., 1868, p. 616.
1868. *Ladas keraudrenii*, Weinkauff, Conch. Mittel., vol. ii. p. 430.
1878. *Atlanta* (*Oxygyrus*) *keraudrenii*, Sowerby, Conch. Icon., Pteropoda, pl. iii. fig. 21*a–b*.
1883. *Atlanta* (*Oxygura*) *keraudrenii*, Lankester, Ency. Brit., vol. xvi. p. 654, fig. 49 (same as Owen).
1883. *Oxygyrus keraudrenii*, Tryon, Struct. Syst. Conch., vol. ii. pl. lxxxvi. figs. 6, 7 (copy of Eydoux and Souleyet, reduced).
1883. „ „ Fischer, Man. Moll., pl. xiv. figs. 24–25 (same as Woodward); p. 582, fig. 347 (copy of d'Orbigny).
1884. *Atlanta keraudrenii*, Sowerby, Thes. Conch., vol. v. p. 148, pl. cccclxxiv. figs. 61, 62.

Habitat.—Atlantic and Indian Oceans.

Oxygyrus rangii, Eydoux and Souleyet.

1852. *Atlanta rangii*, Eydoux and Souleyet, Voy. "Bonite," Zool., vol. ii. p. 369 ; Atlas (1841), pl. xviii. figs. 18–24.
1847. „ „ Lovén, Översigt k. Vetensk.-Akad. Förhandl., p. 191, pl. iv. (Dentition)
1850. „ „ Gray, Fig. Moll. Anim., pl. ccxl. fig. 1 (copy of Eydoux and Souleyet).

Habitat.—Pacific Ocean (Eydoux and Souleyet) ; var., Indian Ocean.

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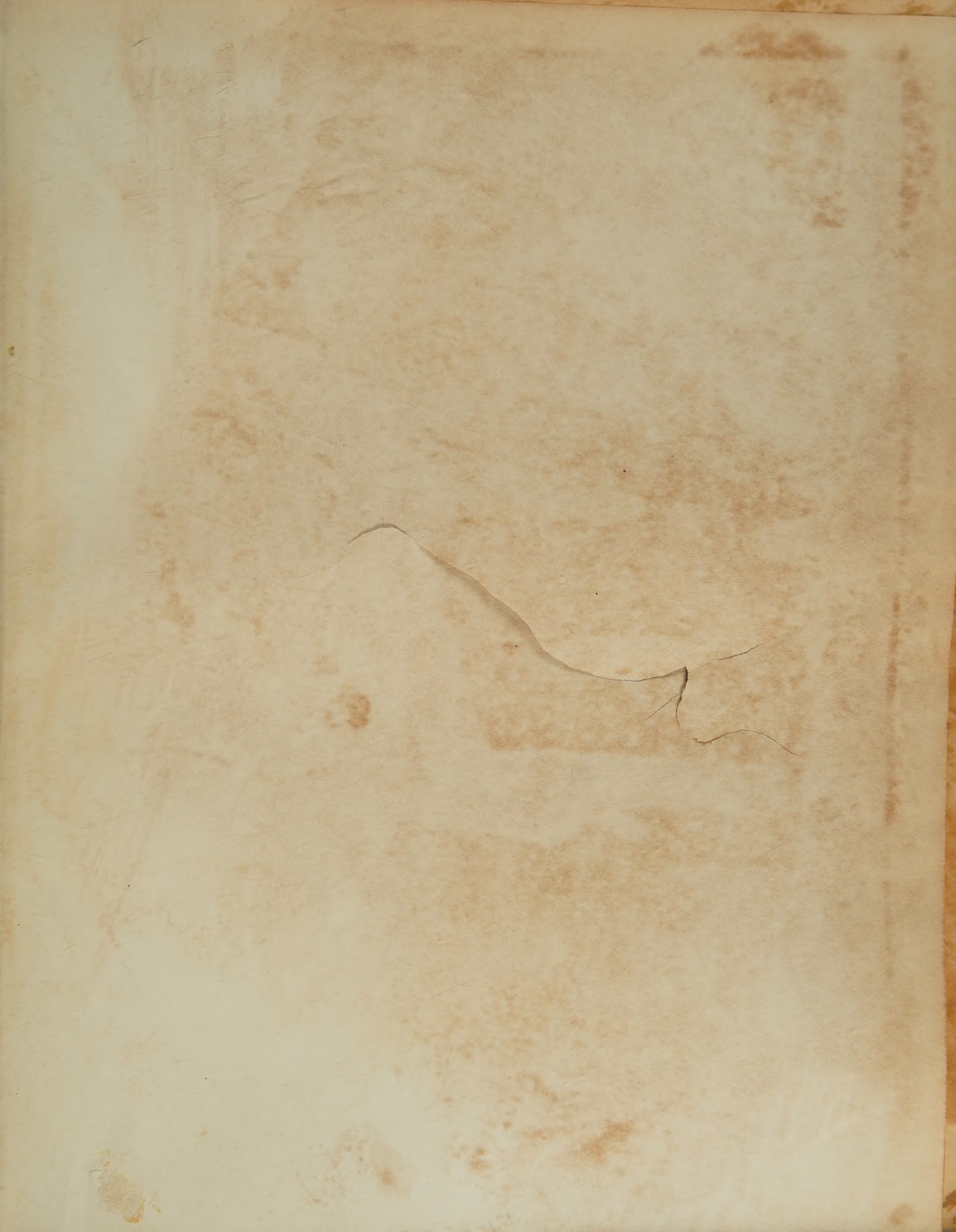

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